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DEVELOPMENT OF FACILITIES MAINTENANCE PLANS FOR NAVY SHORE ACTIVITIES

BY

RONALD W. HERTWIG, JR.

A REPORT PRESENTED TO THE GRADUATE COMMITTEE
OF THE DEPARTMENT OF CIVIL ENGINEERING IN
PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF MASTER OF ENGINEERING

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TO TERI, KRISTEN, AND ADRIA,

YOU WILL NEVER KNOW HOW

MUCH YOUR SUPPORT HAS

MEANT TO ME THIS PAST YEAR.

THANK YOU. I LOVE YOU ALL.

ABSTRACT

The development of a Navy shore activity's facility maintenance plan requires careful coordination of three systems: project development, personnel, and budgeting. The information provided in the three systems and their individual processes has a direct impact on each other.

In project development, the majority of work that is accomplished by a Public Works Department is derived through the Shore Facilities Inspection Program. Specific documentation produced by the Shore Facilities Inspection Program is the Annual Inspection Summary. The Annual Inspection Summary identifies facility deficiencies that require correction before the deficiency has an adverse impact on the facility's ability to support its intended function.

The size and structure of the public works organization is dependent on how much maintenance is required by the facilities, the budget base support available for labor, and the facility support contract requirements. The current trend of quantifying personnel requirements with computers and empirical mathematical models increases the Public Works Officer's responsibility to properly analyze essential mission needs, and to inform the chain of command in a timely manner. A sound working knowledge of the Shore Required Operational Capabilities and the Shore Staffing/Manpower Standards programs is necessary in

communicating with the chain of command to achieve the most efficient organization for maintaining shore facilities. Identification of personnel shortages and/or excesses will also provide input to the use of Facility Support Contracts and the subsequent budget requirements.

Projects are developed from the Annual Inspection Summary for funding by Congress, the major claimant, and the local activity. The size of the maintenance budget is calculated based on the amount of nondeferrable work generated by the Annual Inspection Summary, the size of the workforce, and the use of contract support.

A decision to redirect resources in any one of the three systems requires an identification of the subsequent impact on the overall facilities maintenance plan. The relationship between the three systems can be described by an equilateral triangle. As shown in figure i-1, each system has an equal role in developing the facilities maintenance plan.

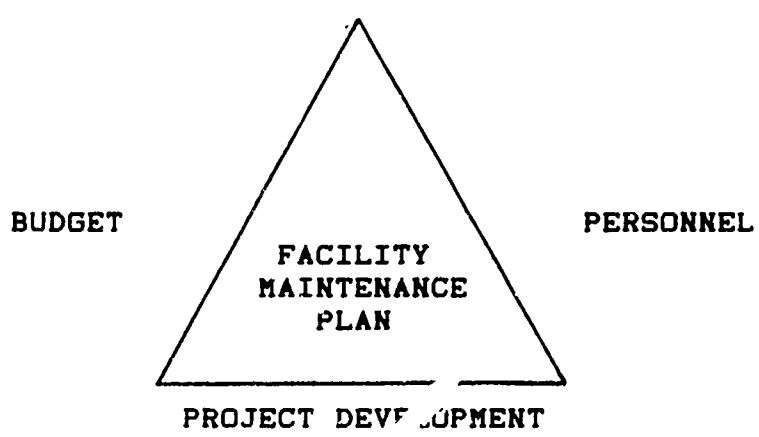
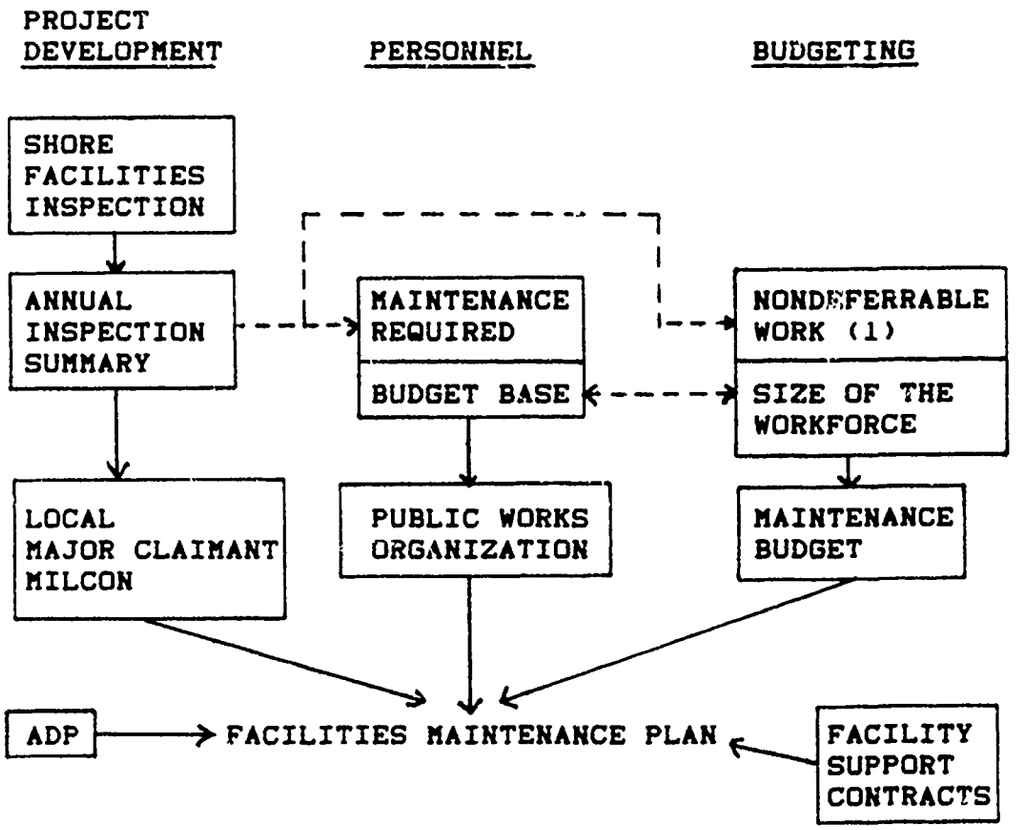


Figure i-1. Facility Maintenance Triad.

Although the triad concept is simple, the individual systems are complex. Figure i-2 depicts the relationships between project development, personnel, and budgeting in the development of the facility maintenance plan.



(1) Deferrable work will affect the long term plan.

Figure i-2. Facilities Maintenance Plan Development.

This report will discuss the intracacies of the systems and negative influences which the Public Works Officer must deal with in the development of a facilities maintenance plan.

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CHAPTER ONE
INTRODUCTION

1.1 Why Facility Maintenance Planning?

There has been a great deal of information published in recent years concerning the amount of money spent on National Defense in our country. In the Navy particularly, an aircraft carrier or a submarine may cost billions of dollars to complete. These systems are necessary for National Defense and they are expensive; however, well maintained shore facilities are also required to support today's Navy and are just as important as the sophisticated weaponry. The current Navy facilities plant replacement value required to support the Navy's mission is in the billions of dollars. Well developed and organized plans are needed to provide the finest facilities possible to support mission requirements.

Accomplishing and integrating the triad of obtaining funds, utilizing personnel, and developing projects is complex and takes time to complete. Facility mangers need to look into the future five years when developing facility maintenance requirements. A proper maintenance plan will include time to plan the efforts which encompasses generating work requirements; properly classifying the type of work and the funding source; as well as planning and estimating the time and costs; executing the plan which includes scheduling the work and monitoring performance;

and appraising past efforts through analysis of feedback reports (6:13-15).

In the past and even in some places today, the prevalent viewpoint for maintenance has been extremely shortsighted. People have taken a "not on my tour attitude" and "if it ain't broke, don't fix it" approach to providing facility maintenance. The five year maintenance plan is not for an arbitrary period, but its duration is directly related to the five-year defense plan or the POM cycle. Requests for personnel, money, and facilities will not normally be received for five years- if they are approved immediately. Therefore, the facilities' managers must develop a viable plan to ensure that the facilities are properly maintained to meet the command's mission.

One official definition of the facilities management function is (6:xi): The maintenance, alteration, repair, overhaul and disposal of land and improvements (lands and buildings); procurement and production of utilities and the operation of utilities distribution systems; the operation and maintenance of construction, weight handling, and automotive and railway transportation equipment; and the provision of public works engineering and related public works services. The task of facility maintenance planning is very complex. Yet, when each of the plan's component's facility development, budgeting, and personnel needs are broken down and the various relationships are tied

together, the system becomes manageable making multi-year planning a viable product.

1.1.1 Purpose

The primary purpose of an effective facility maintenance plan is to properly manage the multi-billion dollar program provided to support the operating forces to the Navy. If there were no ships, submarines, and aircraft, there would be no need for facilities. The readiness, effectiveness, and responsiveness of the Navy depends in a large degree upon the availability and condition of material assets (10:I-1).

Although the primary need for facility maintenance is to support the fleet, there are several other considerations for developing facility maintenance plans (6:xi). First, there has been a tremendous growth in the need for facilities to support the new ships, submarines, and aircraft. The development of the 600 ship Navy is placing a severe strain on the already limited facility related funds. Second, there is a wide range in the age and condition of the current facilities. Over 50% of many facilities at a number of installations were constructed during or before World War II. The older buildings require a great deal of innovative maintenance on the part of the facility engineers to keep them functioning well beyond their useful life. Third, increasing demands are placed on the facilities to support new technology and meet personnel

retention efforts. The technology and lifestyles of the 1940's do not meet the needs of the 1980's. Yet, facilities originally constructed during World War II must be adapted to the 1980's. Fourth, the cost to construct new facilities has risen and continues escalating upwards every year. There are limited funds to support all of the new programs which translates into more effort to maintain facilities beyond their useful life. Finally, civilian personnel ceiling limitations and commercial activity reviews require optimum use of the limited personnel. The facility manager must get as much out of the organization as possible requiring foresight and diligent planning.

1.1.2 Objectives

The basic process of developing a facilities maintenance plan is the establishment of plans and objectives. In order to understand the objectives of the facility maintenance plan, the goals and objectives of the public works organization must be understood (6:xii). First of all, the public works manager must provide the requisite service of facilities support to the fleet. Second, the manager must optimize the output of the public works department with the available resources. These two objectives are further broken down to support facility maintenance planning. The systems developed to support the goals and objectives are complex and not widely understood by people outside of the facilities support establishment.

The public works manager must be careful that the objectives do not become obscured by over-zealous attention to forms, procedures and reports.

The specific objectives of an activity maintenance plan should include (6:6-9): First, provide a proper and consistent level of maintenance to all facilities. This can be accomplished by performing maintenance on a scheduled rather than on an intermittent, breakdown basis. This type of effort will require data indicative of the trouble areas that require corrective management action. Second, increase productivity of the workforce. Efforts are needed to free maintenance supervisors from administrative details and burdens that interfere with direct supervision. This will ensure more direct control over the performance of the maintenance workforce. A correlation must be made between the work force capacity of each work center and the associated workload. Third, provide appropriate response to command requirements. The public works manager must ensure that the facilities meet their functional requirements in support of the command's mission. Finally, each command should strive to reduce maintenance costs. The manager must guard against and eliminate over and under maintenance. Cost reduction can also take place by evaluating a government activity's performance/cost in relation to the local marketplace.

1.2 Chain of Command

As in any large group of people, there is an organization that establishes goals, objectives and provides guidance to assist in accomplishing the goals. The Navy is part of the Department of Defense (DOD) as a subordinate organization. Appendix A is a chart which depicts the organizational relationships. The offices of the Department of Defense, Secretary of the Navy, and Chief of Naval Operations are primarily concerned with overall policy and relationships with Congress. The major players in developing activity facility maintenance plans are the major claimants, for example, Commander in Chief, Pacific Fleet (CINCPACFLT), and the sub-claimants in the chain in command. Engineering and technical support is provided by the Naval Facilities Engineering Command (NAVFACENGCOM) organization.

1.2.1 Major Claimants/System Commands

CINCPACFLT is an operational command concerned with the deployment of ships, aircraft, submarines, personnel, and the facilities to support fleet requirements. As a major claimant, it is responcible for issuing mission/function/task directives, guidance, and priorities for the planning of shore activities (10:II-3). This information is provided to the shore activity through the sub-claimants. The particular chain of command described in appendix A includes Commander, Naval Air Forces, Pacific

(COMNAVAIRPAC) and Commander, Fleet Air Western, Pacific (COMFAIRWESTPAC) as sub-claimants. Delegation of authority in the development of facility maintenance plans will be described in detail in the specific topic chapters.

A systems command is similar in responsibility and function as a major claimant such as CINCPACFLT except for the operational forces. Commander, Naval Sea Systems Command (COMNAVSEASYSCOM) is one example of a systems command and one of its responsibilities is to manage the Navy's shipyards. Each of the eight shipyards has a Public Works Department responsible for developing a facility maintenance plan to support the shipyard mission. COMNAVSEASYSCOM provides guidance and priorities to the shipyard activities for their facility planning.

1.2.2 Naval Facilities Engineering Command (NAVFACENGCOM)

NAVFACENGCOM is the facilities engineering branch for the Navy and reports to the Chief of Naval Operations. NAVFACENGCOM is responsible to provide administrative and technical guidance to major claimants, sub-claimants, and activities for facility matters. Specifically, NAVFACENGCOM's responsibilies includes (3:1-1):

1. Provide authoritative advice and assistance regarding maintenance of grounds, buildings, and structures (class I and II property) and related services assigned.

2. Establish standards and procedures for specialized administrative and technical functions.

3. Provide professional and technical advice guidance, and assistance on facility matters, for example, Military Construction.

4. Perform specialized administrative or technical functions as a service, for example, manage the Navy's construction program.

NAVFACENGCOM's mission statement is broad encompassing a wide range of subjects. To assist in managing the programs, six Engineering Field Divisions (EFD) were established to provide increased support to the shore establishment

The EFD provides shore activities with professional and technical assistance and guidance in maintenance management systems implementation and administration (3:1-1). As such, the EFD provides technical support and systems implementation in the design, construction, operation, maintenance, and repair of public works (4:1-5). Their role in support of maintenance planning includes a six year cycle review on maintenance plans, facility requirement plans, utility assessments, and energy plans. The EFD also supplies technical support and advice to the major claimants. For example, Naval Facilities Engineering Command Pacific Division provides technical review and advice for CINCPACFLT concerning shore activity

construction and repair projects. The EFD also receives limited contract authority to manage the Navy's construction program from NAVFACENGCOM.

1.2.3 Shore Activities

The individual shore activity is the principal participant in developing and implementing the facility maintenance plan. The assigned personnel are close to the problems since they are on site and use the facilities in performing the assigned mission. Commanders and Commanding Officers (COs) are responsible for the development and execution of the facility maintenance plan. In this role, the COs personally exercise their professional judgement in such areas as installation planning; identitifying resource requirements; economic maintenance of good material condition, safety and smart appearance; and utilization and disposal of facilities (10:I-2). Shore activity COs are not normally experts in facility maintenance and rely on the Public Works Officer (PWO) for guidance. Even though the PWO is an officer in the Civil Engineer Corps, the individual is responsible directly to the CO and not to NAVFACENGCOM.

The PWO is responsible for a Public Works Department (PWD) which is the shore facility organizational component designated to provide field activity operation and maintenance support (3:1-1). The PWO is responsible to ensure that the PWD is responsive to the Command's

maintenance and operational requirements. Additionally, the PWO must plan, prioritize, and accomplish maintenance work to produce adequate results in support of the Command's mission. The size and type of a PWD will vary depending on the size and mission of the shore activity it supports. The military officer assignments of a PWD are determined by NAVFAC P-318, Organization and Functions for Public Works Departments, and involves current plant replacement value, number of employees, and facility support budget. Appendix B is an organizational chart of a medium size PWD which will be used as a model for this analysis. For example, in this PWD there are approximately 250 civilian personnel assigned with an annual budget of $15 million dollars.

CHAPTER TWO
FACILITY MAINTENANCE DEVELOPMENT

2.1 Scope

The field of facility maintenance management is extremely complex and can be overwhelming to the untrained person. Intricate programs and systems have been developed to provide a level of manageability to the maintenance environment. Numerous checks and balances are placed into this system to ensure the proper utilization of limited resources. Every project will undergo this process regardless of the size or cost of the work. Decisions are made as to priority and scheduling of work within local authority while recommended courses of action for work outside of established authority are forwarded via the chain of command. The development and execution of maintenance, repair, and alteration projects are formalized through work generation, work planning and control, work accomplishment and evaluation initiated at the activity level.

2.2 Work Generation

Maintenance and repair requirements are identified primarily through a documented facilities inspection program with projects developed, scheduled, and executed in accordance with priorities based on consideration of mission, safety and material conditions (10:III-1). The well developed inspection system will assist in providing a

detailed maintenance plan, but it is not the only avenue available to the PWO. Requests for repairs, or alteration of buildings can be received from the user. The requests may result from an inspection or be found in the daily usage of the facility. The PWO, members of the PWD staff, or any person that observes a discrepancy can report it to the work control center for future scheduling. The more receptive the PWD is to such inputs, the better the possibility of correcting small discrepancies before they become costly and perhaps life threatening.

2.2.1 Shore Facilities Inspection

A planned shore facilities inspection program is the principal work generation method. When the inspection program is properly administered and supported, these inspections should detect deficiencies in the early stages of development, reduce the number of breakdowns and cost of repairs, provide for a more constant flow of work to the maintenance division, and permit better planning for utilization of labor and material through predetermination of forthcoming work (3:5-1). The primary inspection system utilized by the Navy is the Annual Inspection Summary (AIS). The AIS provides for a controlled, scheduled inspection cycle for all of the shore activity's facilities. An example would be the public works administration building that is inspected every two years to review structural, mechanical, and electrical systems.

The building file is consulted to check the results of the last inspection, any work accomplished since then, and the work currently scheduled. The information is compiled which results in a report of the facility condition. The report is divided into deferable and non-deferable (NMAR) work. An estimated cost to correct each deficiencyis also prepared.

A primary concern is the quantity of NMAR deficiencies since if the discrepancy is not resolved quickly, it could result in the inability to support the structure's function or result in elevated costs in the future. A facility discrepancy becomes NMAR under the following conditions (12:2):

1. There is a cost avoidance associated with early repair.
2. A loss/or decrease in mission capability.
3. Life or death threatening situation.
4. Catastrophic environmental disaster may result.

The proper analysis of the AIS should lead to the development of realistic long term objectives and resource allocation plans. Additionally, the correction of the NMAR deficiencies must be a high priority at the local and major claimant level as the AIS report is one of the prime considerations used by Congress to appropriate maintenance and repair funding to the Navy.

There have been increasing problems with the AIS that requires activity action. Reports have often been of such detail that small line items tend to obscure the true maintenance picture. The inspectors look at the small items such as an electrical outlet, but miss the condition of the electrical system. There is an increasing tendency to not see the forest through the trees.

The current promotion system for inspectors may have an impact on the quality of the report. The inspector is one step in the job progression from journeyman to planner and estimator. The scope of the thinking tends to be more related to specific detail, the electrical outlet, rather than on how the entire system functions. This problem will not be solved overnight, but it must be addressed and corrective action started at the activity level. The utilization of an independent Architect/Engineer firm is not the final solution for improving the AIS due to the difficulty in preparing a definitive scope of work.

The validity of the AIS report must be insured to continue application of the program for funding from Congress (6:6-37). Table 2-1 shows the fluctuation in the final AIS report for one activity from 1981-1985. The letter N is for non-deferable and D for deferable work. The numbers 1 and 2 are the years before an impact will be realized in mission readiness.

Table 2-1. Final AIS report for Naval Air Facility, Atsugi, Japan from 1981-1985 (values in thousands of dollars).

	81	82	83	84	85
1-N	1,971	1,227	1,243	923	2,530
2-N	1,535	3,662	2,194	2,200	4,298
N-SUM	3,506	4,889	3,437	3,123	6,828
1-D	2,289	2,259	1,982	1,753	2,743
2-D	1,884	2,233	2,585	2,429	3,753
D-SUM	4,173	4,496	4,567	4,182	6,496
AIS SUM	7,679	9,385	8,004	7,305	13,324

The high figure for 1985 was the result of local actions taken to improve the report by inspecting systems and not just small items.

2.2.2 Other Inputs

Two additional inputs under the shore facility inspection system are operator and preventative maintenance inspection (PMI). Both of the inspections involve the periodic examination, lubrication, and minor adjustment of equipment. The operator inspections are accomplished on equipment to which an operator is assigned; for example, steam generation plants. The PMI work is done on equipment for which a full time operator is not assigned; for example, sewage lift stations. Maintenance personnel perform the inspections while making minor adjustments and report to the inspection branch any discrepancies requiring future correction that are outside the scope of minor adjustment. An inspector will verify the discrepancy and prepare a work request for input into the system.

The most visible aspect of work generation for the PWO is the customer generated work request. The facility user is in the best position to evaluate the day-to-day operation in support of the mission requirements. The customer may observe faulty wiring or may want to reorganize a particular section of a building to provide a better working environment. There are many factors which determine how fast the work will be accomplished; however, based on how critical the work is, completion of the request may not happen for six to twelve months. The PWO may need to provide a satisfactory working environment based on a user's vague requirements. This entails the balancing of over and under maintenanceto the user's needs of a facility. Whatever the result may be, customers should be kept informed as to the project status to ensure they remain an active participant in developing the facility maintenance plan.

As all inclusive as the system appears to be for work generation, there are several methods that are used to provide the remaining input into the activity maintenance plan. The inputs do not normally generate long term projects, but they are part of the daily scheduling of public works resources. Command inspections and zone inspections of working spaces provide line input into the facilities maintenance. One of the most productive inputs is from the PWO while making rounds of the activity. Often

the most obvious discrepancies are missed during an inspection. The most productive PWO will be innovative and open to suggestions for improving facility maintenance.

2.3 Work Input Control

Work input control (WIC) is a formalized means of managing the total PWD workload. WIC provides basic planning and work status information; determining the relative urgency and programming them through the planning phases, authorizing the work, maintaining a balanced and adequate workload in each work center, assuring proper job completion and keeping the customer informed on job status (3:6-2). WIC extends beyond the PWD maintenance shops effort. WIC should be the central collection point for all maintenance, repair, and construction work accomplished and planned to ensure that work is not duplicated.

2.3.1 Type of Work

The majority of the PWD effort, whether it is by contract or in-house forces, can be classifies as maintenance, repair, or construction (includes alteration). The classification as to the type of work is important to the approval authority and influences the funding limitations which will be discussed later.

Perhaps the most important, but least visible aspect of public works, is the maintenance effort. Maintenance is defined as the recurring day-to-day, periodic, or scheduled work required to preserve or restore a real property

facility to such a condition that it may be effectively utilized for its designated purpose (11:5-1). There are generally two types of maintenance, continual and specific. Continual maintenance, for example, is the work accomplished on a steam distribution line to ensure its continual and proper operation. Specific maintenance can be illustrated by the periodic painting of a structure. This type of work is not glamorous but if not properly scheduled may have catastrophic results.

The second type of work provided by the PWD is repair. Repair is the restoration of a real property facility to such condition that it may be effectively utilized for its designated purposes by overhaul, reprocessing, replacement of constituent parts or materials that have deteriorated by action of the elements or usage and have not been corrected through maintenance (11:4-1). Items installed under repair shall be equal in quality and size or capacity to the item removed. There is some room for interpretation and the OPNAVINST 11010.20 (series) should be studied for the appropriate work classification. As a general rule, maintenance differs from repair since maintenance does not involve the replacement of constituent parts of a facility, but involves the work done on such constituent parts to prevent or correct wear and tear (11:5-1). Often, repair work is accomplished by contract due to the high cost and

specialized work required whereas the majority of the maintenance work is provided by in-house personnel.

The third major classification of work is construction. Construction is the erection, installation, or assembly of a new real property facility; the addition, expansion, extension, alteration, conversion, or replacement of an existing real property facility; or the relocation of a real property facility from one installation to another (11:3-1). This classification of work is a very sensitive subject for the PWO in dealing with the Command as Congress has placed specific limitations on this type of work. A maintenance floor has been established which requires a designated amount of money to be spent on maintenance and repair with a small portion allocated for new construction. Project funding will be discussed in chapter four.

2.3.2 Categories of Work

After the type of work has been determined, it is further classified according to the fund types involved, the probable job duration, the urgency, repetitive nature, or purpose of the work, and customer type (3:3-1). This classification will help the scheduling process for in-house and contract effort. The funding action is primarily concerned with who pays the bill. The majority of the effort provided by a medium sized PWD will be funded by the command's budget authorization with a small portion

funded on a reimbursable basis. This type of action normally occurs when the activity receives funding from different sources; however, one activity does not have the resources to accomplish the work.

The probable job duration or scope will provide a significant impact on how the work is accomplished and who will provide the funds. Work for which the PWD is capable of completing and which is within the activity's funding levels is divided into four categories (6:6-15).

The first category is Emergency/Service work. This type of work can be accomplished with minor effort, less than 16 man-hours. The work is unscheduled and constitutes a small portion of the overall PWD schedule (10-12%).

Second, minor work authorizations are provided for projects requiring less than 40 man-hours in duration. This type of effort requires minor planning and estimating assistance.

Third, specific work is accomplished for projects greater than 80 man-hours. Generally, specific work profects receive more engineering and overhead support than the other work.

The last category of work for the PWD is the standing job order. This work is repetitive in nature and is accomplished throughout the year. Maintenance of the steam distribution system is an example of a standing job.

Two larger categories of work are initiated by the PWD, but not normally completed with in-house personnel. Special projects and Military Construction (MILCON) requirements are too large in both funding and scope for the traditional PWD to accomplish. This work is contracted out to the private sector and managed by NAVFACENGCOM through the local contracts office.

2.4 Shore Facilities Planning System

The shore facilities planning system is complex and does not normally affect the expenditure of an activity's maintenance resources. The program does provide input into the activity's overall facilities program from congressional and major claimant funding. Specific direction is provided to commands on the programming of their land and facilities usage. All commands base land and facility management actions upon a Facilities Requirements Plan (FRP) and an Activity Master Plan (10;II-1). These two documents are used by the chain of command to evaluate project requests that are beyond the activitiy's funding authority.

The planning process, as illustrated in appendix C, involves assignment of the activity's mission which determines the facility requirements based on established criteria. This action generates the Basic Facility Requirements (BFR) document. The current facilities assets from the Naval Facilities Assets Data Base (NFDAB) are

listed with an Engineering Evaluation (EE) which provides information on their condition in regards to the mission. The information is compared and action is initiated to correct the deficiencies and surplus. This document is called the Facilities Requirements Plan. The FRP is the comparison of assets and requirements used to develop MILCON for Congress, special projects from the major claimant, and maintenance and repair projects for local funding depending upon project cost.

The second document used to program projects is the activity Master Plan. The master plan is a comprehensive planning document used to ensure logical and efficient use of facilities and real estate assets and to guide activity growth and change (8:4575-1). The resulting document should be sensitive to operational requirements, policy, environmental assets and constraints, fiscal conditions, and human concern. The EFD provides manpower and resources to complete the master plan; however, the activity provides information for the development of the document and is involved in the review process. It is imperative that the Master Plan provides the correct information as to current conditions and where the activity anticipates being in the future.

Construction projects which are categorized as MILCON require long lead time from planning to final completion. Appendix D illustrates the time constraints from project

receipt at the major claimant level to the start of construction. The overall process can take five years for a project that is fully supported from conception to completion and occupancy. Projects of reduced scope which require approval from the major claimant do not require the excessive documentation of a MILCON project, but still require two to three years before completion. The special projects program can provide the activity with tremendous flexibility in solving large facility deficiencies. Projects funded at this level also receive justification from the AIS, particularly non-deferable work. As previously discussed, the shore facilities planning system is on a larger scale, but all documentation is initiated at the local level in response to the overall facilities maintenance plan.

2.5 Activity Effort in Maintenance Planning

The shore activity is the core of the maintenance planning effort. The quality of the AIS as well as the type and number of projects requested depends on the ability of the activity to properly discern the facilities' condition in supporting the Command's mission. Emphasis in developing the activity maintenance plan is on non-deferable work from the AIS, including special project preparation (10:IV-2). Specific emphasis may also be placed on the reduction of NMAR in certain Investment Categories. An investment category is a broad grouping of

facilities that support a mission requirement, for example, investment category 03 is Waterfront Facilities. One goal of the Naval Sea Systems Command is to reduce all NMAR to zero in investment category 03, and certain other designated categories. With this guidance, an activity will direct its efforts with local funding and personnel, along with special project funding, towards reducing the NMAR in the desired categories. This appears easy to do, but is actually quite involved. Future discussion will describe the interaction of the budget and personnel with this chapter concerning local responsibilities in development and priority of the work.

2.5.1 Commanding Officer/Public Works Officer

The Commanding Officer, as explained in chapter one, is ultimately responsible for development and execution of the activity facility maintenance plan. As the facility maintenance manager, the Public Works Officer provides guidance to the CO and implements the final maintenance plan. Information from the AIS, the FRP, and resource limitations are used by the CO/PWO to develop shop and contract capabilities/priorities. Decision making is based on job priority, maintenance standards, level of maintenance, method of accomplishment and the source of funds (6:6-15).

Appendix E illustrates the funding limitations and authority for project approval. Project types can be

combined; however, any combination of types of construction, maintenance, and repair may not exceed the specific authority in any one category. In the past, there has been a reluctance to use local funding to support small contracts within the CO's authority. Emphasis has been on grouping the work into large contracts to be funded by the major claimant. One result is the excessive use of painting and side walk repair type contracts to spend large sums of maintenance money. Reduced flexibility for the CO to do minimum essential projects and delays in completing critical NMAR deficiencies often result due to fund limitations at the major claimant level. This problem may become less severe with the use of phasing. Phasing is a term to describe the repair/replacement of more than one constituent part of a building, such as the electrical distribution system, within a given year. In the past, this was considered incrementation and illegal. The use of phasing allows for separate projects within a facility to be completed in the areas of electrical, mechanical, structural, etc within the CO's authority.

Deterioration of many shore facilities well in advance of that which should result from proper maintenance is the outcome of too frequently deferring corrective action to avoid its expense (10:IV-1). Maintenance and repair costs can be reduced if they are caught at an early stage. The CO/PWO must seek out work aggressively and prioritize the

efforts to ensure a properly maintained facility. The CO/PWO team is the driving force in guiding the efforts of the public works department.

2.5.2 Maintenance Control/Engineering/Maintenance Divisions

Maintenance Control, Engineering and Maintenance divisions are the core of the maintenance planning and execution effort of a shore activity. Maintenance management at the local level involves separate control of the overhead and direct labor personnel, or the planners and doers (6:1-8). Maintenance Control provides the planning, with assistance from the Engineering division when required, and Maintenance is responsible for executing a portion of the maintenance plan. Recall that the overall maintenance plan also involves work outside of the shop force's capabilities. There is not a clear cut separation of responsibilities, but an overlap to ensure that items are not overlooked. An example of the overlap is the repair of an electrical distribution system within a building. The electrical engineer designs system improvements which include a materials list; the planner and estimator will phase/plan the work and check the materials list; and then, prior to ordering the material, the shop planner will again confirm the materials list.

The functions of the Maintenance Control Division (MCD) are to inspect facilities for maintenance and repair

deficiencies; to receive all work and classify it; to plan, estimate and recommend work priorities; and to propose proper methods of accomplishment (6:1-9). Given the above definition, MCD should keep the "bubble" on the overall maintenance condition of the activity as its entire effort is directed towards maintenance management. Additionally, MCD is responsible for developing the activity MRP spending plans and issuing work authorizations to the maintenance shops in accordance with these plans (4:3-8). MCD receives direction from the PWO while using the AIS and the results of the Station Facilities Planning Board as guidelines to develop the spending plans. The highest priority of the plan is to correct NMAR deficiencies within the department's capabilities (funding and manpower). The work approved by the Station Facilities Planning Board is small in scope, but primarily involves construction projects. An additional known quantity is the standing job order. This is a type of work that can be scheduled and which may occur all year long or may be seasonal. NMAR deficiencies, construction projects, and standing job orders, will provide the majority of the facility inputs into the maintenance plan.

Work requests submitted to MCD are provided with a priority number based on a chart similar to appendix F during the classification process. The work request is placed on a WIC chart to track the progress through

planning, estimating, material ordering, scheduling and completion. Maintenance of the WIC charts is necessary to ensure knowledge of project status and the effect of changing priorities. Project control generally tends to belost after deciding on how the work will be accomplished. Determination of work accomplishment is based on workload of the shops, urgency of the work, capabilities of the shops to do the work, and the comparative cost to contract the work. The driving emphasis on the decision making process for MCD is the maintenance shops which may distract from balancing the bubble on the overall maintenance plan. The MCD often becomes overly concerned with maintaining a 4-6 month backlog of work in the shops and not necessarily with providing the most productive method of accomplishment. If the work is to be accomplished by the shops, Maintenance Control maintains positive control over the scheduling and status. If the work is to be accomplished by a contractor or other means, Maintenance Control may take the "not my problem" approach. This is somewhat understandable as Maintenance Control no longer has direct control of the work. The PWO must be aware of this potential problem and ensure open communication between the appropriate divisions so that the MCD is the central point for the entire maintenance plan.

A second problem in the maintenance control area is the process of "first in, first out". This applies primarily to work that has been assigned the same priority, however, in classifying the work the tendency is to push the classification down to ensure the system is not over burdened with too many high priority projects. The date on which the work request was submitted becomes the next level of priority. This creates a system which is unresponsive to the overall needs of the activity by becoming customer driven rather than planned effort. A continual review of the backlog, biweekly or monthly, should be conducted on work to be planned and estimated. This review will provide a second look at a request for duplication of effort already planned and to determine if the work is really required.

Maintenance Control receives support from the Engineering Division in executing and developing the maintenance plan. Engineering is responsible for the local preparation of plans and specifications, facility planning documents, Architect/Engineer contracts/studies, and EFD coordination (6:2-15). The primary role in the maintenance plan development is production engineering. Production engineering is responsible for engineering functions beyond the capability of a planner and estimator in support of maintenance, repair, and alteration work accomplished with in-house forces or by contract (4:3-6). Organizational

conflicts often occur as Engineering does not appreciate Maintenance Control directing its efforts in supporting in-house projects. Ultimately, communication between the divisions may deteriorate to the point where there is ineffective coordination. The PWO must be aware and involved in the communication between the two divisions.

The engineering director should be required to maintain a production schedule of assigned work. The schedule should be revieved by the PWO biweekly or monthly to provide input to Maintenance Control and the contracts office for scheduling, and the financial director for planned expenditure of funds.

A great deal of effort will be expended in Architect/Engineer contracts as most medium sized PWD's will have one or two engineers qualified as civil, architectural, mechanical, and electrical with limited technical support.

The Maintenance Division is the "doer" in the PWD and contains the construction building trades required to maintain the station facilities. The maintenance division should be sized to only perform maintenance work - minor construction, major repair and maintenance should be accomplished by contract (6:2-19). The efforts of the Maintenance Division are not visible to the untrained eye, but are very important. A highly trained and organized division will perform timely maintenance which will provide

quality facilities beyond their useful life. As a line division, Maintenance should perform as a contractor with the shop load plan as a contract. The shop load plan is one of the planning tools used in preparing the facilities maintenance plan.

2.3 Public Works Scheduling

The shop load plan is one of several scheduling tools used to develop the facility maintenance plan. Effective planning and scheduling of the overall public works effort is required to ensure the limited maintenance and repair funds are properly expended. Maintenance Control is the center for the public works scheduling effort. The work input control charts provide a record of the continuous status of any work request. The WIC chart will not normally provide projections for completion, but will provide the current status.

The annual inspection summary is accomplished on a schedule of inspections. The schedule is prepared in accordance with NAVFAC MO-321, Maintenance Management of Shore Facilities. The recommended intervals are provided on the facility card and extracted each year to list the facility and type of inspection to be accomplished. This method ensures that all facilities will be periodically inspected to assist in prolonging their useful life.

The most important scheduling provided by Maintenance Control is the shop load plan. Effective shop scheduling

provides orderly and economical job accomplishment as well as orderly work introduction into the various work centers (3:9-1). There are two shop load plans, short range and long range. The short range shop load plan is for a period of one to three months. The shop effort is scheduled for 90%, 80%, and 70% (over three months respectively) of the Maintenance Division's capability. The plan includes leave, overhead, emergency/service, minor and specific work, inspections, and standing job orders. Recurring work should be the first priority since when recurring work is not accomplished on schedule, it inevitably becomes breakdown maintenance. One of the goals of a well prepared maintenance plan is to avoid this situation. Breakdown maintenance is uncontrolled and cannot be stopped with the limited personnel of the maintenance division. The long range shop load plan is from four to twelve months in length. Only 50% of the productive effort is scheduled to allow for changing priorities or unforeseen conditions.

The Engineering Division schedules its in-house effort and the work accomplished through contract by any independent Architect/Engineer firm. The in-house effort includes engineering effort, completion of specifications for contracts, and input for submission of special projects and MILCON. Engineering schedules have their greatest impact on special projects and contracts. The contract portion must be planned to ensure timely advertising and

award of contracts. The size of the contracts is normally significant and impacts heavily on the maintenance execution plan.

A well developed program will backlog work for one to two years. This enables the financial section to plan expenditures for an entire year which is particularly critical during the first quarter of the fiscal year.

2.5.4 Customer Liaison

The status of work requests is used for planning and for customer feedback (6:6-13). The PWD may be efficient, hard working and accomplishing important projects for the station, but if the customers are not kept informed, the efforts may not be nearly as effective. The capability and quality of the facilities impact directly on the functions they serve. If an aircraft maintenance group is receiving new equipment, but requires new electrical power before it can be used, a status report on the PWD efforts is needed for the customer to plan for the equipment arrival. This type of effort requires open two way communication between the customer and public works. Public works needs to know early in the equipment acquisition process what is required and when. In return, the customer needs status information in planning for the new equipment.

An adversary type of position between public works and the command frequently occurs due to the lack of adequate communication concerning the operation. This problem can

be overcome with an open channel of communication. Public works is there to provide a service and the customer needs to know how and when the PWD can help.

One method is the use of the Station Facilities Planning Board. The board is comprised of representatives from the station with the executive officer as the chairman. The majority of the PWO's business should not be involved in this meeting, however, the application of limited construction/alteration funding should be discussed. Individual departments are invited to defend the validity of their projects and also observe the operational requirements of their contemporaries. The final decision of the board will often set the minor construction projects for the fiscal year. The board will also give the PWO an excellent opportunity to inform the departments on major project status and what to expect in the future.

Public Works is a service organization and should keep its customers informed and involved in facility matters.

2.6 Summary

The Commanding Officer of a shore activity has the ultimate responsibility in the maintenance of the assigned facilities. The Public Works Officer, as the facilities manager, is responsible to the CO to properly maintain the facilities. The PWO and his staff develop the projects for input into the facilities maintenance plan through work

generation, work planning and control, and work accomplishment and evaluation. The maintenance control division is the focal point for work generation, planning and control.

The primary input for work generation is the Annual Inspection Summary. The AIS was developed for use by Congress in justifying the Navy's facility maintenance budget. Several problems have occurred with the AIS and action is required at the activity level to ensure the AIS is a viable product for use up through the chain of command and with Congress. Primarily, the AIS must be more system oriented and not work with single items. The PWO must be an active participant in the final preparation to ensure an accurate report is submitted. Other inputs are received by work requests, the station facilities planning board and facility users.

The work that is generated must also be properly classified as maintenance, repair or alteration to ensure proper identification in allocating resources. Maintenance Control is also responsible for tracking work requests and maintaining control of the activity's maintenance situation.

Work that is too complicated for Maintenance Control is provided to the Engineering division for support. Engineering not only provides production engineering for the Maintenance division, but also produces the

documentation for the Shore Facilities Planning System. This effort includes special project and MILCON scope preparation work and some subsequent design. The SFPS is part of the long range maintenance plan as projects often take 3-5 years for completion.

The Maintenance division is the doer in the maintenance program. The short and long range shop load plans are implemented by the Maintenance division in conjunction with Maintenance Control and Engineering support.

The PWO is the prime motivator in the development and execution of work for input to the facilities maintenance plan. A tremendous amount of information from the chain of command and in-house forces must be processed to properly prioritize work accomplishment.

A five year maintenance plan is needed to ensure deficiencies documented by the AIS are corrected prior to deterioration of mission essential functions. The five year plan will eliminate breakdown maintenance by proper identification of deficiencies and scheduling timely corrective action.

The PWO must also ensure that the PWD divisions work together to allow for the proper flow of information in developing and executing the maintenance plan. A dynamic flow of information within the department will help in communication with customers concerning work status.

The accomplishment of good facility maintenance does not happen overnight. Projects must be identified well in advance to allow for proper funding and personnel resources to accomplish the work.

CHAPTER THREE
PERSONNEL ORGANIZATION

3.1 Scope

Organizations are created to accomplish a specific mission or goal. The public works mission is to provide a service in maintaining the Navy's shore establishment facilities. The public works organization must be flexible to accommodate foreseeable workload fluctuations, including plans for shifting employees among jobs in peak or slack periods; however, care must be taken not to provide too much flexibility. Figure 3-1a describes the classic public works organization. The amount of work (jobs) is plotted against the size of jobs in man-hours. The applied effort is the response of the organization in satisfying the workload. There is a problem as there are a number of service calls not completed and a large backlog of larger projects. Figure 3-1b is one try at reorganization to reduce the backlog. The result is that the completion of service calls is reduced. Figure 3-1c is the subsequent reorganization to respond to service calls which generates backlog problems. This type of reorganization is not as simple as the three figures depict.

Every manager wants to obtain the most efficient organization (MEO) for performing facilities maintenance. Several constraints have been placed on the PWO which will be discussed further in this chapter. The PWO who

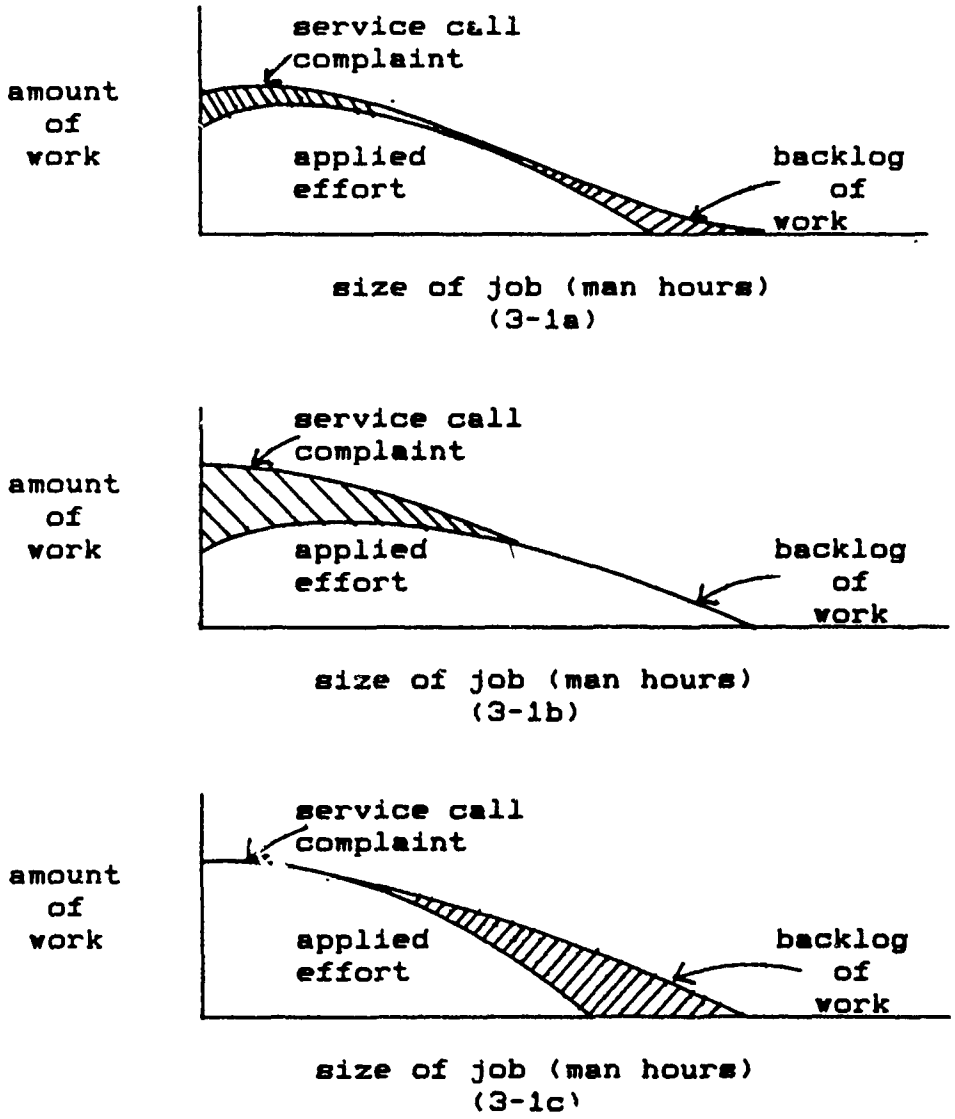


Figure 3.1. Public works organizations (a) classic (b) eliminate backlog (c) eliminate service calls

the system will be in a better position to reorganize personnel and utilize other options to obtain the MEO.

3.2 Public Works Maintenance Organization

The public works organization is subdivided into program elements consisting of identification of requirements, development of a plan, execution of the plan,

and appraisal and adjustment of the plan required to achieve the desired goals (4:1-1). A more general division of the functions are the Administrative/Technical and the Operating divisions. The Administrative/Technical divisions include Administration, Family Housing, Engineering, and Maintenance Control. The operating divisions include Maintenance, Utilities, and Transportation. Since Maintenance Control and the Maintenance divisions are directly involved in the development and execution of the facilities maintenance plan, they will be considered in more detail.

The Maintenance Control division in a medium sized PWD may have a staff of approximately sixteen people as shown in appendix G. There may be more personnel depending upon maintenance service contract requirements. The division is divided into three branches of inspection, planning and estimating, and work input control (4:3-9). The efforts of the inspectors, master scheduler, and WIC have been previously explained.

The planner and estimator branch will prepare detail work orders which includes cost for labor and materials as well as man-hours required for each shop. This information is provided to the Maintenance Control Director and the Master Scheduler for planning purposes.

The Maintenance division executes the planning accomplished by the PWO and MCD. In a medium sized public works department, there is normally a combined ceiling in the Maintenance and Utilities divisions of 75-399 positions. Since public works is primarily concerned with facility maintenance, maintenance is normally the largest division. Appendix H is an example of how many personnel and how the maintenance organization might look in a medium sized activity. The Maintenance division shown has 127 people in six general branches: administrative; building, metal, and electrical trades; general services; and emergence/service (4:3-14). This type of organization may vary depending on the particular mission of the shore activity. Organizational changes may also occur based on age of facilities, emphasis of maintenance, and use of facility support contracts (chapter five). How the organization is established is one function of position management.

3.3 Position Management

Position management was established to assure that personnel resources are organized and work is assigned among positions in a manner which will serve mission needs most effectively and economically, and establishes basic criteria for operating such a program (14:1). In this regard, a systematic position review should develop the optimum organizational structure. The structure may never

be achieved, but remains a valid goal and should be updated as circumstances change. The development of the optimum structure will create a distribution based on a workload analysis. The organization's staffing is then based on average rather than peak workloads, using work measurement criteria and considering workload trends (14:II-4). The EFD is the best source for assistance in developing the optimum public works organization.

With this program, every proposed new position or change to an existing position should be reviewed against the optimum structure to determine whether or not the action should be taken. The optimum structure will provide a goal for the PWO in establishing the MEO. This will prevent haphazard reorganizations in responding to the whims of any one individual. The process in attaining the MEO is not accomplished overnight due to the administrative inertia within the civil service system.

Budgets and personnel ceilings also impact on personnel changes. Where funds or other controls prevent 100% staffing of an entire organization, "must do" functions are more fully staffed than "should do" functions (14:II-4). Often, the use of construction and facility support contracts can augment the lack on in-house personnel resources.

The key for the PWO is to know the services required, to know the optimum structure to provide the services, to

know how the current organization is structured and operates, and then to develop a plan to provide those in-house services with the attainable organization. The position management information generated by the shore activity is also used in the preparation of the budget and ceiling requests to the major claimant. Use of proper position management procedures will increase the likelihood of obtaining additional funds and/or ceiling points if required. The Navy is currently working on the standardization of organizations with the SHOROC/SHORESTAMPS system, defined below.

3.4 Shore Required Operational Capabilities (SHOROC) and Shore Staffing/Manpower Standards (SHORESTAMPS)

SHOROC/SHORESTAMPS is a computerized system designed to standardize the shore activity's mission and the subsequent personnel requirements. The SHOROC system is utilized for defining tasking of shore activities through functional statements as part of the Shore Manpower Document Program (SHMD) (9:1). Each shore activity is required to document the functions provided under the broad mission assignment provided by the major claimant. The information is broken down into mission area, functional area, required functional capabilities (RFC), and a parameter to measure the workload (9:1).

An example of a completed line item in the SHOROC system is FAC 04.003 20 37 0. The code FAC is for

facilities support and is the mission area. The first two digits, 04, is the functional area and signifies "maintain facilities". The numbers .003 signify provide maintenance control services for a PWD and is the required functional capabilities. The parameters for measurement in this case are 20 specific job orders completed per month, 37 minor work orders completed per month, and 0 is the activity type. The PWO will be primarily concerned with the facility support mission area.

The billet occupation classification (BOC) code is also listed with the RFC and provides the link between mission and personnel. The BOC code is the only common data element available to compare in an automated manner the SHMD supported manpower requirements of a given RFC to the current authorization of the same function (9:12). The BOC code also appears on the manpower authorization document (1000/2) for each authorized billet. Therefore, every individual assigned a BOC code of FED , is there to accomplish the mission FAC 04.003. The personnel listed in appendix G will all be assigned the BOC code FED.

In an effort to standardize organizations and reduce the analysis required to validate each shore activity's request for additional personnel, the SHORESTAMPS system was established. This program provides an empirical equation which utilizes parameters provided under SHOROC to

establish the associated personnel requirements identified as the staffing standard.

The procedure generally used in developing the staffing standard is as follows: First, a data call is forwarded to the shore activities for information concerning a specific RFC. The information required is normally more detailed than the parameters listed in SHOROC. The information for each activity is then tabulated by the major claimant and a computer assigns the empirical equation to represent the assigned staffing standard. The equation and the resultant staffing organization for each activity is returned to the activity for comment. The major claimant analyzes the activities' input and provides the final decision on whether implementation will occur or not. During this entire process, billet transfer is not authorized into or out of the RFC under study. Also, whether the standard has been implemented or not, the command must obtain major claimant approval for any personnel action that will add or delete billets in the specific RFC.

The SHOROC/SHORESTAMPS process is somewhat complicated which can result in an attempt to short circuit the system. This type of attitude will delay any efforts at reorganization and, in fact, prolong the process. The development of the facilities maintenance plan not only requires the type of work to be accomplished, but how the work force must be shaped to properly execute the plan. It

is essential that long term personnel planning be accomplished in conjunction with facilities planning. The SHOROC/SHORESTAMPS program is geared to the five year defense plan and personnel planning must be provided for accordingly. Retirements and resignations must be anticipated to assure total program development with the appropriate funding. Reorganizations not only require approval of the major claimant in consonance with the personnel rules described, but as will be discussed in the next chapter, the appropriate budget base transfer to support any changes.

3.5 Summary

Personnel actions related to the public works organization should be taken to satisfy the activity's mission. The primary activity tool in developing the most efficient organization is position management. The Public Works Officer must know what service is required by the command, know the optimum structure to satisfy mission requirements, know the current organization and its operation, and then must develop a plan to implement the MEO.

The major claimant utilizes the SHOROC/SHORESTAMPS program to analyze each activity's billet structure and organization. This system is useful for the major claimant as it provides a relationship between the assigned mission and the type of billets required for support.

Implementation of computerized staffing standards by empirical equations can have dramatic effects on the number of authorized personnel. The PWO must be aware of implemented standards in order to reorganize billets or to receive authorization to vary from established standards if required. Without this authorization, personnel cuts may automatically be made at the major claimant level with the activity unable to justify retaining the billets.

A link exists between mission and personnel authorizations by a billet occupation classification code. Billets cannot be shifted from one mission function to another without major claimant approval. The impact on the activity facilities maintenance plan as long term planning is necessary to implement the MEO or facility support contracts.

CHAPTER FOUR
FACILITIES MAINTENANCE BUDGET

4.1 Scope

Facility resource programming and budgeting is an integral part of the total Navy, Planning, Programming and Budgeting System. The AIS is one system that has been developed to provide a link between the allocation of funds and the quality of shore facilities. Traditionally, the PWO never has enough money to do all the work that is needed for facility maintenance. This problem often happens for three reasons. First, the AIS has not been the most reliable tool when discussing budget needs with Congress. Second, there is not a sufficient amount of funds available. Finally, job detail and budget preparation work at the activity level has been poor.

The public works budget is a statement, in financial terms, of the plan of operation for the department for a given time span (6:13-11). The activity will normally execute a budget from a lump sum provided by the major claimant. The maintenance budget preparation and execution should reflect a reduction in NMAR based on major claimant priorities. This effort requires an accurate AIS and a well developed plan of action to maintain the shore activity's facilities. The specific operation of the budget process and execution can be very involved; however, the PWO must be acquainted with a number of the inner

workings in order to successfully develop the facilities maintenance plan.

4.2 The Budget Process

The budget process involves the shore activity, the major claimant, and the chain of command in providing Congress with the appropriate information in order to receive the proper funding level to maintain National Defense. For purposes of this report, the facilities maintenance program at the major claimant and activity levels will be emphasized.

The major claimant and the activity accumulate the information in support of the funding level required in order to maintain the facilities at an acceptable level to support the specific command's mission. This information is used by the Department of Defense to assist Congress in the preparation of the National Budget. Once Congress has completed the final budget and the President has approved the package, the authorizations are provided down the chain of command for execution. The final approved level of funding is not necessarily the amount initially requested by the activity.

The preceding information has been an extremely brief review of the complicated budget process. The remainder of the chapter will be devoted to the budget effort for maintenance at the major claimant and activity level.

4.2.1 The Budget Cycle

In working with the budget cycle, time is broken into three different years: The "past year" currently operating under; the "current year" which begins 1 October and starts the next fiscal year; and the "budget year" which is the current year plus one year (6:13-12). Information is provided for facility requirements for each of the three years. The primary time of concern for the PWO is the February in which the budget requirements for the next year, or the current year in budget terms, begins to formulate. By the end of March, the information is provided to the activity comptroller to be forwarded to the major claimant. This cycle is primarily for day to day maintenance requirements and special project priorities for major claimant approval. The MILCON budgeting time frames were previously discussed and shown in appendix D. Past funding history will be used by the activity to continue planning to ensure projects are ready for the next fiscal year to execute the new budget. Funding authorization for the new fiscal year, 1 October to 30 September, is normally received in the middle of September. At that time, day to day maintenance dollars are provided by a one year appropriation.

Special project funding is provided by the major claimant for previously approved projects. The activity must prepare the special project documentation as early in

the cycle as possible to ensure design funds are authorized in a timely fashion. The design process will take from six to nine months depending on the complexity of the project. The optimum approach is to receive design approval and funding before the end of the past fiscal year for construction award in the current fiscal year. Close liaison with the major claimant will assist in the process.

4.2.2 Major Claimant Responsibility

The size of an individual shore activity's budget is dependent upon the decision of the major claimant. Major claimants are also responsible to establish administrative budget controls to ensure that facilities are properly maintained (10:III-2). Funds are now authorized to be used for maintenance and base operations. The funding authorization used in the past were more involved. Categories included transportation, utilities, and engineering support to name a few. These categories now fall under the title of base operations.

The authorized funds for maintenance must cover labor, material, and any local contracts that have been approved during the budget submission process. The overall budget is submitted and justified to the major claimant by the activity as a total package. The budget must address ongoing as well as planned maintenance and the affect on the mission if the appropriate funding is not received.

From the major claimant level, any increase to one command must come from another command's budget (6:13-12). This fact requires precise planning by the activity to ensure mission essential projects are properly documented by the AIS. Unless the activity can sufficiently document their maintenance requirements, the major claimant will often provide funding based on a "fair share". The larger the organization or base, the more funding that will be provided.

The activity PWO must not be content with this type of reasoning if the facilities require additional maintenance. The major claimant is normally aware of each activity's physical plant condition, but may not be completely aware of future or present requirements unless brought to their attention by the local command. The budget is an excellent method of making the major claimant aware of any requirements so that a proper decision can be provided.

The major claimant will also provide the activity, as a part of the maintenance budget, a percentage that may be utilized for minor construction projects. The percentage can be a maximum of 10%, which was established by Congress, or can be as low as 0%. The level of backlog in the AIS is often used by the major claimant to determine the final percentage. Minor construction percentages of 5-7.5% are

normally provided to the activity. The overall expenditure of 10% can not be exceeded by the major claimant.

4.2.3 Activity/Public Works Input

The Comptroller has the ultimate responsibility to the CO for the preparation and expenditure of the activity budget, however, the PWO must be an active participant (6:1-11). The PWD normally has the largest portion of the activity's budget. The PWO must then be very familiar with translating the facility needs into the budget process.

There are several sources for the PWO to use in preparing the public works budget. The PWO must know the department's requirements for labor, material, and facility support contracts. Identification of the major claimant's and the CO's priorities will also impact the required amount of maintenance funds. If the priorities require multi-year programming, the PWO should establish reasonable goals and objectives and budget accordingly. The requirements of reimbursable customers must also be known in order to include their needs within the activity's plan. The Station Facilities Planning Board is another source for construction/alteration projects which may require additional authorization for minor construction in the new fiscal year.

The most important source of information is the AIS. The AIS is tied to the maintenance budget at congressional levels by investment category (6:13-26). As mentioned

earlier in the report, the importance of a high quality AIS report cannot be over emphasized due to its relationship with the budget. This connection is very sound since by relating real property needs to operational requirements, credibility is built into the programming and budgeting process (6:13-22).

The funds budgeted for facility maintenance can be divided into four sub-systems (6:13-21):

1. Funds to offset annually generated requirements.
2. Funds to offset the marginal growth in backlog due to backlog deterioration.
3. Funds to offset marginal growth in backlog due to backlog inflation.
4. Funds to systematically reduce the backlog.

Items 1 and 2 must be funded in order to offset real growth in the backlog. This is true in theory, but with the inadequacies of the AIS and the realities of the budget, even the most important items may not get funded.

4.3 Budget Execution

Once Congress and the President have approved the final budget, the money for the fiscal year is then allocated to the various agencies. From the activity viewpoint, the funds will be authorized by the major claimant. Specifically, the "maintenance floor", or authorization, are funds appropriated by Congress for maintenance and

repair which must be spent only in those areas. Also, the activity may not transfer these funds to other funding categories (6:13-8).

The maintenance and repair funds allocated to the activity are designated M1/R1 and comprise the maintenance floor. M1 funds are allocated for activity level maintenance and repair to include labor, materials and contracts (6:13-26). R1 funds are defined as a percentage of maintenance funds designated for minor construction/alteration (6:13-27). Similarly, M2/R2 funds are provided to the major claimant for items such as activity special projects.

Once the funds have been allocated to the activity, an execution plan must be developed to ensure proper expenditure of the funds. Normally, activities tend to do number crunching without proper planning and to spend money just to spend money. The thought process has been, if we do not spend all of our money, the decision makers will provide less money next year. Developing the execution plan is not extremely difficult; however, the PWO must be tenacious to ensure a proper plan is accomplished. Labor is a consistent expenditure of funds with minor variations such as retirements and resignations. Retirements should be planned so that a suitable replacement can be available with minimal or no interruption in service. Personnel shifts into or out of maintenance funded positions requires

long term planning (previously discussed in SHOROC/SHORESTAMPS) and must be properly budgeted or it could have an adverse impact on the execution plan.

The second area for expenditure of funds is material. Material is normally used by shop personnel in accomplishing job orders assigned by Maintenance Control. The general plan for a PWD is to carry a 4-6 month backlog of projects for the maintenance shops. Maintenance Control is provided the authority to spend money in order to maintain the appropriate backlog. If Maintenance Control cannot give a specific funding level that is required to maintain an adequate backlog, the PWO should place a dollar limitation on the expenditure of funds by the MCD. Once this has been accomplished, the PWO must closely observe the backlog for major fluctuations. The placing of spending limitations will provide a more stable execution plan for the next phase.

A comprehensive two year plan is necessary for design and construction of large construction contracts. Two years is preferred due to the time required for design and to identify the proper quarter for the expenditure of funds. The size of the contracts will be in accordance with the local authority described in appendix E. Year end planning of contract awards is especially important. The PWO should plan to swing fund (last quarter or first quarter of next fiscal year) projects for fiscal years.

This will help to properly plan first quarter expenditure in which a high obligation rate is difficult to achieve but which is expected by the major claimant.

The amount of effort expended in budget preparation may not result in receiving all of the requested funds. This fact does not diminish the need for the unfunded projects. This category, unfunded requests, may receive consideration by the major claimant later during the fiscal year. Often a redistribution of funding is accomplished at mid-year and year-end to meet the changing needs of the Navy. A well developed execution and facilities maintenance plan will greatly assist in retaining the initial authorization and perhaps receiving additional funds. Unfunded requests which are essential to the activity's mission require precise justification statements. Good planning and an accurate AIS will go a long way in providing the right information. Table 4-1 is an example of the maintenance funds received by one activity from 1981-1985.

Table 4-1. Naval Air Facility, Atsugi, Japan maintenance funding for FY 1981 - FY 1985. (note: APF stands for annual planning figure and numbers are in thousands of dollars)

	81	82	83	84	85
Initial APF	3,507	4,090	2,788	3,395	3,591
Add year end	115	346	625	462	75-500
Final APF	3,622	4,436	3,413	3,857	3,666min

The development and execution of the budget is a year around long responsibility for the PWO. Flexibility and

foresight must be the key words in properly executing the facility maintenance plan. Several other areas can provide funds to accomplish additional projects. Savings in energy and labor funds due to retirements, quits, gapping, etc, may be made available for transfer. Proper execution of the budget while maintaining the facilities in a good condition requires the development of a strong facilities maintenance plan.

4.4 Summary

The activity comptroller is responsible to the Commanding Officer for the proper budget development and execution of station funds. This does not exempt the PWO from being an active participant since public works normally has the largest departmental budget in the command. The PWO must properly plan facilities requirements to provide an accurate input to the budget. This includes an accurate AIS and a long term maintenance plan.

The AIS provides one of the relationships used by Congress in providing facility maintenance funds to the Navy. Additionally, the amount of funds provided to an activity is tied to the Shore Manpower Document and the number of personnel required to satisfy an activity's mission.

The funds authorized for facility maintenance is received as a maintenance floor which can only be expended

for facility maintenance. Funds may be transferred by an activity into maintenance but not out.

The PWO must have a long term maintenance plan particularly for contracts to properly execute the budget. One tool is to have numerous designs completed for year-end so that projects can be swing funded for fiscal years depending on fund availability.

CHAPTER FIVE
FACILITY SUPPORT CONTRACTS

5.1 Scope

The use of facility support contracts serves two functions in government today. First, the government should not compete with the commercial sector in providing goods and services. A secondary feature of this idea is to challenge the quality and productivity of the public sector. A difficult problem has been the inefficiency of some government organizations and the high costs of providing services. In this regard, the facility support contract may be less costly to the government. Second, facility support contracts allow the application of limited in-house manpower where it is most necessary. Figure 5-1 describes the application of the facility support contract to the PWO.

5-1a 5-1b 5-1c

Figure 5-1. PWD staffing vs facility requirements

Figure 5-1a is the ideal situation in which the PWD is fully staffed to satisfy the Command's requirements.

Figure 5-1b and 5-1c describe an overload situation facing most of the Navy today. Figure 5-1b is a case in which, for one reason or another, the maintenance staff was reduced and the facility requirements remained constant. Figure 5-1c is a related situation in which the staff remained constant, but the facility requirements increased. The overload placed on the PWD must be corrected in order to ensure there is not an adverse impact on the Command's mission. The facility support contract is one method used to satisfy the overload problem and promote open competition with the commercial sector.

5.2 Commercial Activities (CA)

In the process of governing, the Government should not compete with its citizens. It has been and continues to be the general policy of the Government to rely on commercial sources to supply the products and services the Government needs (15:1). The theory and required actions of government activities are detailed in the Office of Management and Budget Circular NO. A-76 (revised) of August 4, 1983. Competition is considered healthy for the economy and government as it enhances quality, economy, and productivity. There has been a duplication of effort by the federal and commercial sectors in providing goods and services in the past.

The Federal Government has grown substantially due to the lack of competition for goods and services. An

increased emphasis has been placed on the federal sector to utilize the commercial sector in supporting mission needs. Whenever commercial sector performance of a Government operated commercial activity is permissible, comparison of the cost of contracting the cost of in-house performance shall be performed to determine who will do the work.

Certain functions are inherently Governmental in nature and in being so mandate performance only by Federal employees. These inherent functions include criminal investigations; direction of National Defense; conduct of foreign relations; and direction of Federal employees to name a few.

Of particular interest to the PWO in developing the facility maintenance plan, are the areas in maintenance considered commercial activities. Maintenance work under consideration include design, engineering, construction, modification, repair, and maintenance of buildings and structures; building mechanical and electrical equipment and systems; elevators; escalators; moving walks; as well as construction, alteration, repair, and maintenance of roads and other surfaced areas (15:9). The primary topics of consideration are the management study in developing the most efficient organization and the development of the performance work statement which will be the format used to measure the functions desired output.

5.2.1 Management Study

The commercial activities listed in the OMB circular A-76 requires review once every five years if approved for in-house continuation. The type of review for a new activity or an old one, includes the establishment of a management team which consists of personnel in management analysis, contracting, cost analysis, field supervisors, staffing, position classification, value engineering, and industrial engineering. Simultaneously, the most efficient organization and the performance work statement study/development are performed by the CA management study team to ensure evaluation of the most efficient rather than old methods and procedures.

In this context, efficient (or cost effective) means that the required level of workload (out, as described in the performance work statement) is accomplished with as little resource consumption (input) as possible without degradation in the required quality level of products or services (15:III-1). The management study team will prepare an organization and work flow chart to be used in the final preparation of the performance work statement (PWS). The final government cost estimate will be also prepared using the results of the study.

Performance indicators are used to describe the desired output of the function under study. The indicators are not always easy to obtain nor determine, however, some

performance indicators must be devised. Performance indicators generally useful in CA management studies are of five types: quantitative, qualitative, timeliness, effectiveness, and cost. These indicators provide the framework for developing the MEO and the PWS.

5.2.2 Performance Work Statement

The preparation of the PWS is critical since it is the basis for the cost comparison. The PWS must describe what is to be done without describing how it is to be done. The development of a quality PWS is the result of the management team effort in which the use of job analysis is the primary tool. The job analysis study utilizes the following steps (15:12):

1. Organizational Analysis - identifies the services to be provided.

2. Prepare Tree Diagram - each job is broken down into smaller components.

3. Work Analysis - measure input, work, and output in steps needed to do the job.

4. Gather data on how much input is required to do the job, and how often the output is provided.

5. Performance Analysis - describe how the service can be measured.

6. Analyze Directives - provide information on specific methods that are required (should be kept to a minimum).

The final PWS should then be completed in the approved format. The EFD can also provide assistance in preparation and review of the PWS as well as supply a standard PWS that can be used as an outline. Care must be taken to ensure pertinent information is provided since the standard PWS is not all inclusive. The final PWS should now express the contract desired output in clear, simple, concise, and legally enforceable terms.

5.2.3 Award Contract vs In-House

Although there is a requirement for certain commercial activities to be studied, there is some flexibility for the PWO in developing the facilities maintenance plan. The concept of the management study team can help the position manager develop the MEO to provide the best level of resource utilization. Limited personnel resources may dictate a reorganization to provide in-house accomplishment of one function and award a contract to accomplish a different function. Any function to be analyzed requires a consideration of: total resources; time to complete the work; funding pressures; type of work; capital investment requirements; costs/economics of in-house vs contract; and the amount of control required over the work (7:2002-2). Appendix I is an example of a flow chart used in the CA process to get from point A (what to do) to point B (award contract or in-house) in a step by step procedure. The use of these charts will assist in analyzing existing

Government activities and expansions, new requirements, and analyzing existing contracts for conversion to in-house, respectively.

Should the decision making process lead to the advertisement of the PWS for cost comparison, a long lead time is required to ensure proper contract procedures are followed. The final steps in preparing the PWS includes the in-house cost estimate. The in-house cost estimate shall be based on the most efficient and cost effective in-house operation needed to accomplish the requirements in the performance work statement, and shall be in accordance with agency staffing and personnel regulations (15:I-12). The contract cost comparison is based on a firm bid, three year contract length (base year plus two option years) is required to guard against "buy in" pricing, or proposal competitively obtained in accordance with Federal Procurement Regulations (15:I-12).

Some of the time factors involved include: OICC/ROICC requires approximately 70 days; EFD review may be 1-3 months (if the contract is large enough to require PWS review); preparation of the PWS depends on the complexity of the function; and minimum wage determinations requires 30-45 days from the Department of Labor.

After the bids are opened, the next step is the critical pre-award survey. This process is extremely important as it evaluates the contractor's ability to do

the work specified in the PWS. Once the bid and the contractor have been evaluated, the cost comparison of the commercial cost must be more than 10% of the government cost to award a contract. If the contract is not awarded, the activity must begin to implement the MEO within one month and be completed within six months of the bid opening date. The overall evaluation process is very time consuming as a complicated function for cost study, contracting out, including a subsequent reduction in force may take as long as 18 months. The average time is 11 months and a simple function may take 8 months to complete (7:2321-1).

The final determination of required CA study or a decision by the PWO to conduct a volunteer study may dramatically affect the facility maintenance plan. Resources are required to conduct the study and prepare the PWS and the end result may affect future planning of the available resources. The A-76 program amplifies the need for the multi-year maintenance plan for personnel, budgeting, and project accomplishment. Each area of the plan affects the work processes of the other requiring the well developed maintenance plan to be established 2-5 years into the future.

5.3 Advantages vs Disadvantages

The facility support contract can greatly assist the PWO in executing the facility maintenance plan or can

increase the problems up to ten fold. Prior to working in this area, the PWO must understand the good and bad of facility support contracts in order to maintain the flexibility needed in establishing priorities (7:2300-7). One advantage that will help the comptroller is that funds are obligated. When the contract is signed, the funds are obligated for the year to support the work. Second, credibility is normally established since the government is dealing with an experienced contractor (if the pre-award survey was properly conducted). Third, since the work is accomplished by contract, the work will be inspected. This cannot always be said of the in-house effort. The government will be utilizing the skill and expertise of the private sector. This program will reduce the growth of the government and duplication of effort. In most cases, the government will realize an overall cost savings by doing the work by contract. Also, a better response time should be achieved through segregation of the workforce. Another advantage to management is that the government transfers the burden of scheduling and managing the work to the contractor.

The disadvantages at any given time may carry more significance than the advantages (7:2300-7). For example, although the government may save money with the contract rather than utilizing in-house resources, there are the costs of contract administration and inspection. There are

specification preparation problems in determining just the right legal language. With a commercial contract, there exists the possibility of a strike. The loudest argument against facility support contracts is that the PWO will lose responsiveness and flexibility by not having in-house forces available. It is also very difficult to remove a poor contractor which can make a bad situation even worse. Finally, whenever there is a major change in an operation there are transition problems.

It is inevitable that every activity will have a facility support contract for one reason or another. The PWO that can understand the advantages and disadvantages of the program will find managing the challenges not too difficult.

5.4 Summary

Facility support contracts have primarily been developed from the premise that the Government should not compete with the private sector in providing commercial services. Not all services performed fall into this category such as National Defense; however, many functions of facility maintenance are covered and must be investigated for possible conversion to the commercial sector.

The first step is the establishment of a management study team comprised of knowledgeable activity personnel. The team will simultaneously determine the most efficient

organization and the performance work statement to be used in contract advertisement.

The final determination will be done by a cost comparison received during a formal bid process. If the commercial bid is more than 10% below the government cost based on the MEO, the commercial sector is awarded the contract. If not, the activity MEO must then be implemented within one to six months from bid opening.

The facility support contract can also be used to supplement manpower shortages. The PWO must be aware of the advantages and disadvantages prior to implementing any action. The use of facility maintenance plans in how work is accomplished and the required amount of funds.

The facility support contract is an excellent tool for the PWO in providing quality facility support to the shore activity.

CHAPTER SIX
AUTOMATED DATA SUPPORT

6.1 Scope

The programs discussed in the previous chapters contain a tremendous amount of information for the PWO to utilize in the development of a facility maintenance plan. This information has been prepared through manual methods in the past which often resulted in the information being too old to be useful. In some cases, the information was not available due to manpower shortages. This has created situations in which maintenance plans have been incomplete or non-existent. The advent of the microcomputer has provided PWOs with the technology required to store and retrieve the necessary information. Information is now available when it is needed enabling the PWO to quickly update the maintenance plan as different situations dictate.

NAVFACENGCOM has been the leader in developing two systems which are currently being installed, Base Engineer Support, Technical (BEST) and the Micro Facilities Support Plan (MFSP). The Naval Data Automation Command has initiated development of a program called Base and Station Information Systems (BASIS). The systems are currently being installed throughout the Navy so there is no field information available concerning their performance. Expectations are high for improving facilities management.

Given the complexity of the programs and the diversity of the information required to develop a workable maintenance plan, the optimism displayed by the program developers is valid.

6.2 Base Engineer Support, Technical

The primary function of the PWO is to maintain the Navy's shore facilities. The application of the BEST maintenance module provides a management tool to accomplish this function in an efficient and effective manner (1:vii). The BEST program also contains information modules for Housing, Utilities, and Transportation. Concentration will be on the maintenance module since it directly affects facilities maintenance planning. The objective of BEST is to increase productivity in PWDs by providing a simple, flexible, interactive ADP system to be operated and controlled by existing functional personnel (1:2-1).

BEST was developed using the maintenance management systems, programs, and concepts provided in NAVFAC MO-321, Maintenance Management of Shore Facilities, and NAVFAC MO-322, Inspection of Shore Facilities. In using the NAVFAC manuals, BEST gives the ability to manage day-to-day operatoons by giving current and reliable information on the status of public works. Management indicators and targets have also been established to aid managers in executing the maintenance programs. BEST provides the

management indicators and targets in the three broad areas of public works maintenance management; work generation, work planning and control, and work accomplishment. The maintenance subsystem consists of the following four modules (1:2-1):

1. Emergency Service (E/S)
2. Shore Facilities Inspection (SFI)
3. Work Input Control (WIC)
4. Facilities Engineering Job Estimating (FEJE)

The E/S and SFI modules provide information on the most uncontrolled and controlled methods of inputing work into public works, respectively.

The E/S module supports all efforts associated with managing the E/S operation. The module provides rapid work request processing and data retrival ability, performs statistical analysis on E/S work orders, facilitates the use of Engineered Performance Standards (EPS), and generates E/S management analysis reports on demand (1:2-1). The work center/craft supervisor can focus tn the management reports to increase E/S workforce productivity and responsiveness. E/S reports include backlog, job turnaround time, and standard vs actual hours used.

The SFI module produces schedules for both controlled inspections and preventative maintenance inspections, with accompanying work orders which specify inspection requirements, frequencies, and inspection time standards

(1:2-2). Overall, this module leads to better work scheduling, project selection, and maintenance.

The WIC and PEJE modules impact on the greatest number of work requests processed by public works. The WIC module provides all around clerical operations associated with the majority of work requests. The four submodules associated with WIC include (1:2-2):

1. Work Identification and Status
2. Shop Load Planning
3. Operating Plan
4. Contract Status

The Work Identification and Status submodule develops and maintains a workload identification system, provides planning and status data on work from its reception to completion, and controls planning of work to facilitate shop loading and scheduling (1:2-3). This program will also transfer work from the active to the history file upon completion.

The Shop Load Planning submodule provides a plan for scheduling work to the public works shops and relates the PWD backlog to manpower available for accomplishment (1:2-3).

The Operating Plan submodule records funding commitments, obligations and expenditures. This permits a forecast of resource distribution over the available manpower and projected workload. Integration of workload

and resources allows continuous evaluation and prioritization of the backlog.

The Contract Status submodule tracks work orders programmed for contract performance. It can also be used to detect potential scheduling conflicts with in-house work forces (1:2-3).

The FEJE module is a computerized version of the Enineered Performance Standards (EPS) handbook, NAVFAC P-700 series, which provides for both scoping and detailed cost estimates (1:2-3). FEJE also allows for input to use local standards appliceble to the EPS system. The module will print out final cost and work center effort. Additionally, the system can link with work input control, scheduling and memorandum accounting systems where required.

6.3 Micro Facilities Support Plan

The MFSP program has been initiated to assist the facility manager in developing the capability to accurately project deficiencies and anticipate problems in order to execute timely action for the best use of maintenance dollars. The poor condition of shore facilities, the past wasted AIS efforts, and manual planning/estimating have identified the need for an automated process. The module developed is not system dependent, although it is data base dependent, in that it is a stand alone microcomputer application. The system currently used is a Zenith Z-120

microcomputer. This system is not as comprehensive as BEST, but is expandable to complement BEST. Currently, the MFSP system is being installed where BEST is not used, partcularly in support of Public Works Center customers.

The program provides mechanized maintenance and repair information which can be prioritized and developed into firm work requirements in terms of job orders, minor work authorizations, and fundable estimates and job plans - also provides and relies upon sound controlled maintenance inspection, AIS development, and accurate inventories of real property plant account at local commands. The information processing can be used for level multi-year MRP funding plans; projection of potential special projects; information to assist in MCON replacement project decisions; appropriate lead planning for scheduling of work requirements; and development of design like estimates for maintenance funding.

The two keys to this program are the AIS and the development of funding estimates. The MFSP links the AIS data into logically arranged planning estimates and definable multi-year maintenance and repair plans for buildings, structures, and other real property. The problems associated with the AIS have been previously defined and must be addressed for this progeam to work. The manual preparation of cost estimates for the AIS is a problem which the computer can solve.

The MFSP provides for a simple complementary estimating system for fundable, scoping, inspector, contract, and step I or step II project estimates. The productivity goal for planning and estimating is 75 hours of shop work generated per hour of P&E effort. Studies done at PWC Guam have indicated that the goal can be easily achieved. In fact, shop work generated hours has been as high as 162 to 1 after the program was in operation for only four months. This program has not only increased the productivity, it has reduced the time for fundable estimates and increased the number accomplished.

The actions required to develop the comprehensive plan for the MFSP include (2:summary):

1. A complete review of AIS reports to identify facilities with the most significant number of maintenance deficiencies.

2. Review of all current special projects for maintenance and repair and the future status of these projects.

3. A study of the Base Master Plan and the Base Facilities Requirements List.

4. An analysis of all current active work requests for maintenance and repair work.

5. Interviews with the following personnel to collect data indicating recurring maintenance problems: Staff Civil

Engineer and staff; self-help building managers; on site PWC personnel; and individual building occupants.

These actions should provide the facilities manager with (2:summary):

1. A history of maintenance and repairs on specific structures, paving, roofs, exterior coatings, and waterfronts.

2. Description of current conditions of all structural components, including electrical systems, plumbing/mechanical systems, wall structure, and finishes (windows/doors,etc.).

3. List of deficiencies found with descriptions or required repairs to correct the deficiencies.

4. Itemized estimates for maintenance and repair requirements to provide assistance by priority with current and future requirements and planning.

In summary, the end results for the MFSP include; an upgrading of the current facility inspection system management process to result in an effective and accurate long range facility plan; improved capability to evaluate the most effective solution for an identified deficiency and the ability to estimate it accurately; and, to provide a facilities maintenance plan that, at any point in time, is an accurate and current inventory of maintenance deficiencies for analysis of planning and funding work (2:5-7)

6.4 Base and Station Information System

Base and Station Information System (BASIS) is a new program which evolved from the Naval Data Automation Command (NAVDAC) to improve the PWD information flow. The initial work was accomplished to provide the shore activity CO with an information system to improve decision making capability. The initial goals were expanded as more research was accompliched to include increased productivity and a decrease in organizational costs with better equipment/methods. The final BASIS package is very similar to BEST as it contains modules for materials, transportation, administration, engineering, emergency/service, shore facilities inspection, family housing, with future development of utilities and contract administration information. BASIS is able to interface with BEST and is more comprehensive in the number of modules available.

There was no interaction done between NAVDAC and NAVFACENGCOM concerning development of the BASIS program. It is untested and parallels BEST in module development. Care should be exercised to not consider BASIS for a shore activity CO's use because of the amount of information available. This is not to state that a CO should not have complete information availibility, but that the tremendous amount of information contained in the BASIS program could tend to cloud decision making rather than enhance it.

6.5 Summary

The tremendous amount of information used to develop and execute a facilities maintenance plan requires reliable and current information processing. The objective of the public works management information system is to manage rationally on the basis of reliable data. Management reports are used to establish realistic goals, objectives, and plans for accomplishment of tasks to support the activity mission with the given resources. Management reports provide the ability to:

1. Alter plans to more closely match capability.
2. Identify and correct deficiencies in execution.
3. Change capabilities or reorganize to better accomplish tasks.

The total maintenance management system must be appraised to include all work areas to identify items for correction. The Public Works Administrative Director is normally used for appraisal since this individual does not supervise the work or the planning. Reports have been provided manually, but the advent of computers has reduced significantly the required effort to produce the reports.

The development of mini and microcomputers has and will continue to have a positive impact on public works management. The BEST and MFSP programs provide execellent automation to the processing of the information covered in chapter two. Information and performance indicators are

readily available for work generation, work planning and control, as well as work accomplishment. The use of computers in providing management information reports to assist the PWO will ultimately provide better work scheduling, project selection, and ultimately improved facility maintenance. The systems are data dependent so the PWO must be careful of the computer adage of garbage in, garbage out.

CHAPTER SEVEN
CONCLUSIONS AND RECOMMENDATIONS

Proper maintenance planning involves much more than the development of projects to spend money authorized for a given year. A solid facilities maintenance plan will include project development, personnel needs, and funding requirements for a five year period. This facilities maintenance plan triad is an important concept as each of the three systems impacts the other.

The Annual Inspection Summary, as a part of work generation, impacts heavily on project development and maintenance funding. The Public Works Officer must take an active role in its preparation to ensure system inspections are performed and not just small line item discrepancies recorded. Often, project identification for the AIS can be discovered during routine inspections of the base by the Public Works Officer.

Emphasis must be placed on the scheduling of controlled inspections, the shop load plan, and production engineering to allow for long term planning. The scheduling effort will affect budget expenditures, contract workload, and often mission essential activities of the Command. The maintenance plan is not static and should be continually monitored and adjusted to meet the Command's requirements.

The PWO must emphasize total planning on the part of Maintenance Control. As the primary focal point for work

generation, Maintenance Control must know the total maintenance picture and not be concerned only with the maintenance shops.

Communication is an extremely important element to sound maintenance planning. The numerous schedules and tremendous amount of information required to formulate the maintenance plan requires an open flow of information internally and to the customers. The Commanding Officer and other customers should know what public works is doing to help support the mission.

Public Works Officers frequently do not get involved in understanding the personnel side of the triad because of time and the system's complexity. A complete maintenance plan cannot be developed without a thorough understanding of how the department should be organized and how to achieve the desired results along with their affect on the maintenance plan. The activity mission and the support requirements must be analyzed to determine the optimum structure of the organization. Mission requirements and billets necessary for work accomplishment are programmed by the major claimant through SHOROC/SHORESTAMPS. It is not enough to develop the most efficient organization locally. The major claimant controls the activity's billets and funding and must be involved early in the planning process. Changes do not occur overnight as personnel moves require long term planning along with work development.

The shape of the organization may influence how work is accomplished, or perhaps, the organization should be adjusted to support changing work requirements. Personnel actions also affect funding levels when billets are transferred between different cost centers, such as utilities personnel to maintenance. Without a subsequent budget base transfer, there will be less money available for maintenance contracts since more money will be expended for labor.

One of the greatest assets a Public Works Officer can have is a good financial manager. Well documented information is essential in the preparation and execution of the maintenance budget. Budget preparation and execution is enhanced by a well defined maintenance plan which describes facility deficiencies, the proposed schedule for correction, and the impact if the schedule is not followed. The amount of funds received as the maintenance floor depends to a large extent on the AIS, but also involves unfunded requirement documentation. The PWO must have a clear understanding of the financial picture at all times in order to take advantage of possible savings or the location of excess funds in other categories. Examples include energy savings and swing funding of construction contracts at year end to take advantage of year end funding and to ensure a proper obligation rate for the first quarter of the next fiscal year. Project planning to

satisfy this type of execution often is started two years in advance for identification, design, and contract preparation.

There are two tools available to the Public Works Officer which can have a positive or negative impact on the facilities maintenance plan. The implementation of the Commercial Activities program to remove competition between the federal and private sector has directly impacted maintenance planning. The program has forced activities to implement the most efficient organization thus improving productivity. Additionally, the use of the facility support contracts can assist in providing essential services when personnel resources are not available or are required for another function. There are several disadvantages that must also be considered before implementation of a facility support contract. Adverse affects on current employees and start up problems for a new program are only two areas to investigate.

The tremendous amount of information required to develop and execute the maintenance plan can now be provided in an accurate and current fashion through the use of automatic data processing equipment. Implementation of BEST and MFSP systems will enhance public works productivity in maintenance planning and execution. Indicators and targets are used to analyze efforts thus providing instant analysis on the current status of the

PWD. Well informed and timely decisions can be made concerning projects, personnel, and finance matters.

The Public Works Officer, as the facility manager, must be able to temper the information processed in developing the maintenance plan with common sense and good judgement. The Public Works Officer should be flexible, innovative and farsighted as the maintenance plan is not static. Finally, a good maintenance program is like an insurance policy, particularly if the program covers five years of facility maintenance planning.

The following recommendations are provided for developing the shore activity's facilities maintenance plan;

1. Typically, there are never enough hours in a day for the PWO to accomplish all the assignments that need to be done. Requirements from the CO and various customers often require immediate response and can become overwhelming. The PWO must not lose sight of why the position exists. Shore facilities need to be maintained which requires long term planning. It is relatively easy to become too involved in solving short term problems which may obscure the overall picture. As a result, the PWO will not succeed in supporting the Command's mission.

2. Project development, personnel, and budgeting are difficult programs to thoroughly comprehend. Project development often receives the majority of the PWO's

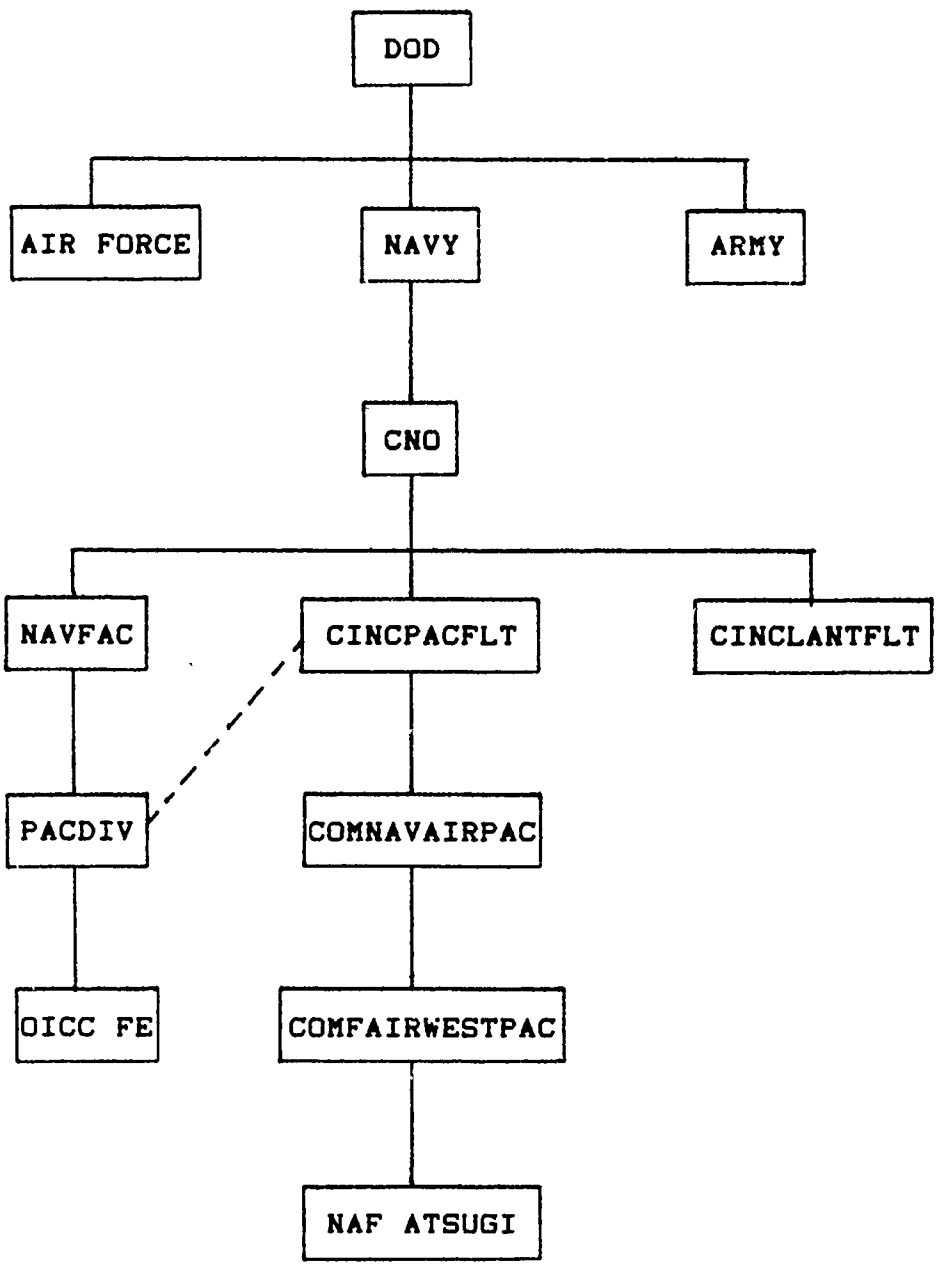
attention. As engineers, a great deal of satisfaction is felt from the development, execution, and completion of a construction or repair project. Budget and personnel planning is considered important as managers, but not very exciting. The systems are complex and a cursory understanding is not enough to develop a sound maintenance plan. Extra effort must be exerted to understand the systems and more importantly, comprehend the relationships in the overall facilities maintenance plan.

3. The PWO must be innovative and flexible in developing the maintenance plan. Numerous tools are available and more are being developed each day. The technology in automatic data processing has expanded exponentially in recent years. The tremendous amount of information required to develop the maintenance necessitates the sound application of ADP equipment. Additionally, the facility support contract has been a much maligned tool for the PWO. Commercial Activity review is required in certain functions, but it can also be used voluntarily to support other mission functions.

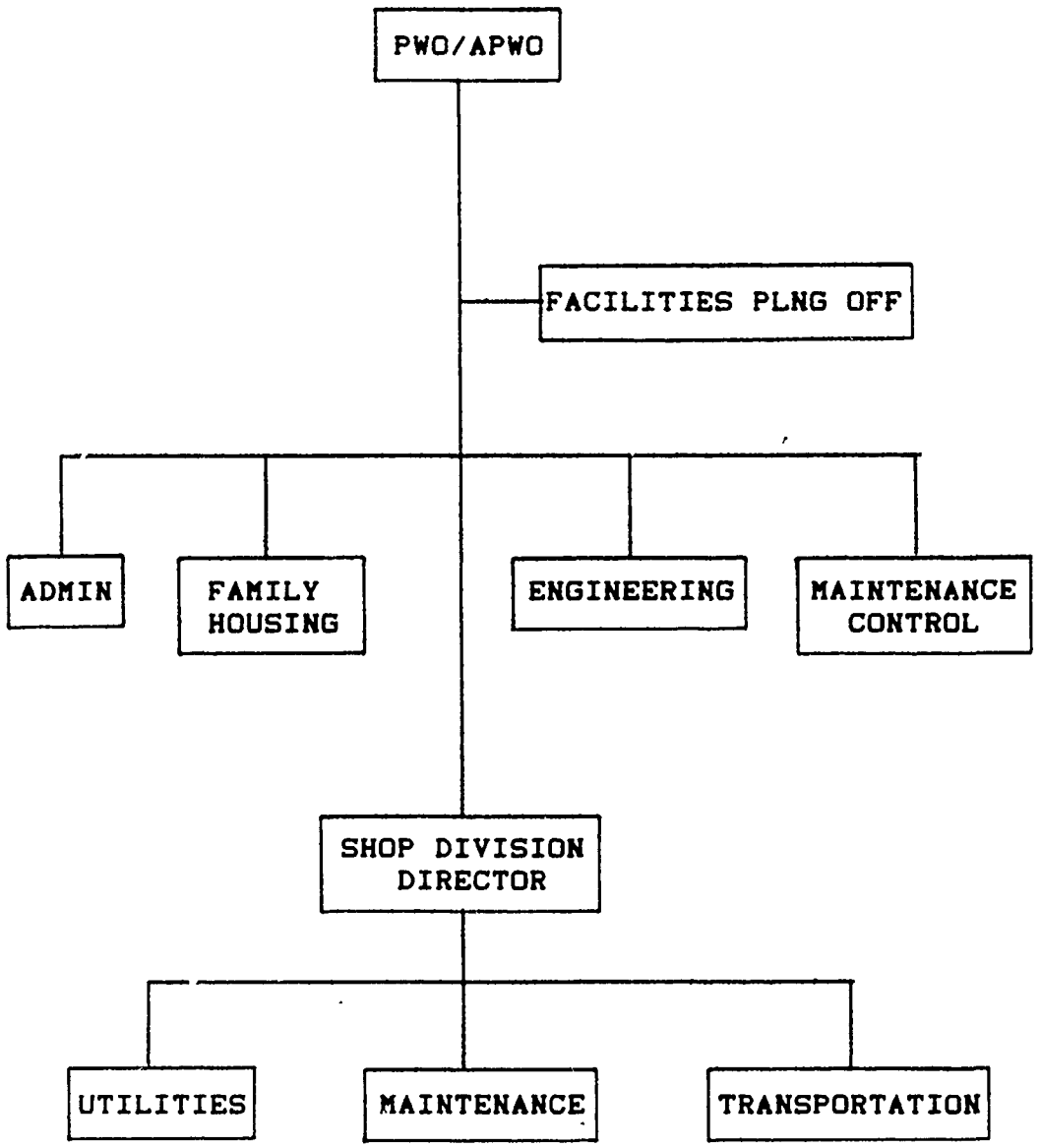
4. The PWO should strive to develop a comprehensive maintenance plan for a two year time period. A large portion of the five year maintenance plan is identified by MILCON, special projects, recurring work, and facility support contract requirements. The remaining portion of work identified by customer requests, minor construction,

emergency/service work, etc. cannot be firmly identified beyond two years. Planning for two years will ensure proper expenditure of funds and timely accomplishment of locally funded projects. The two year planning effort also corresponds to the budget process. The long term planning will assist Command's in requesting additional funds/projects or defending their position in budget/personnel reductions.

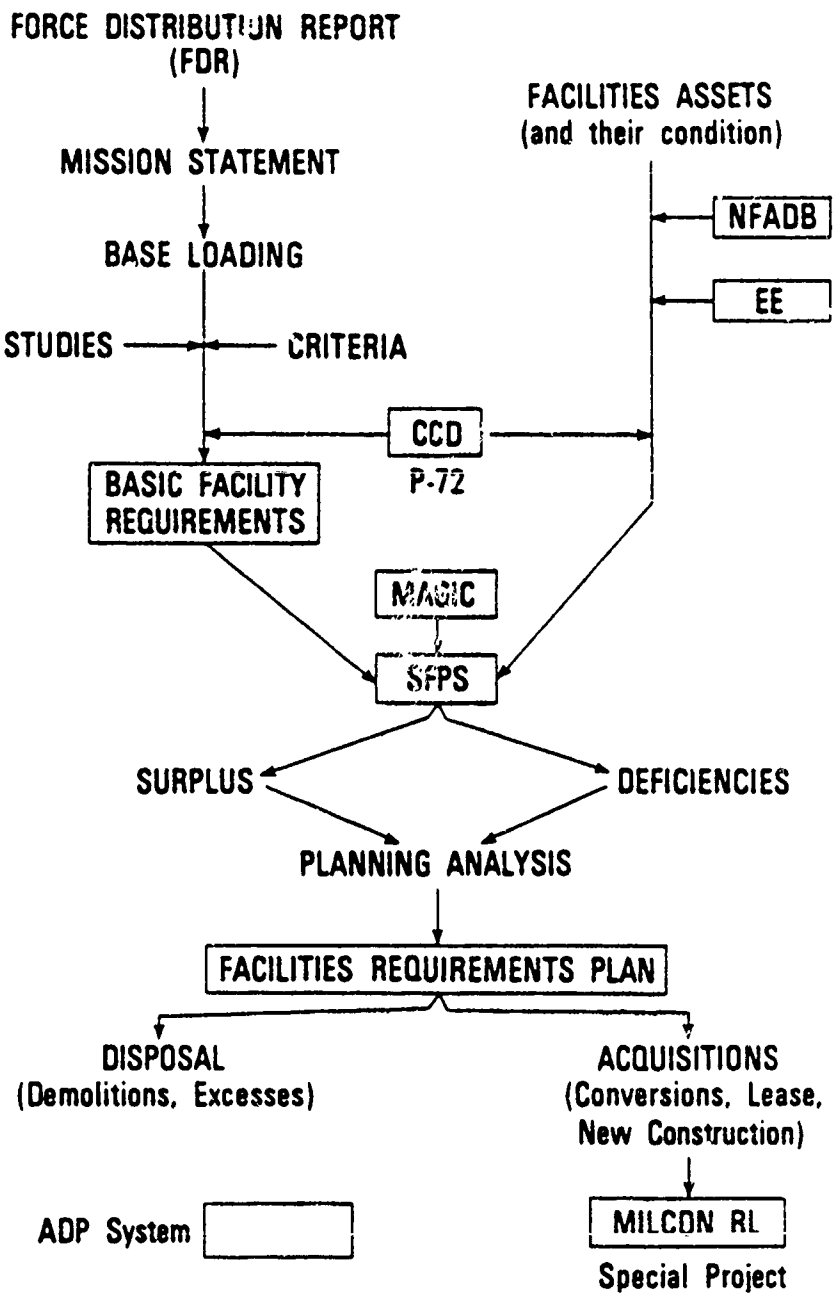
APPENDIX A
CHAIN OF COMMAND



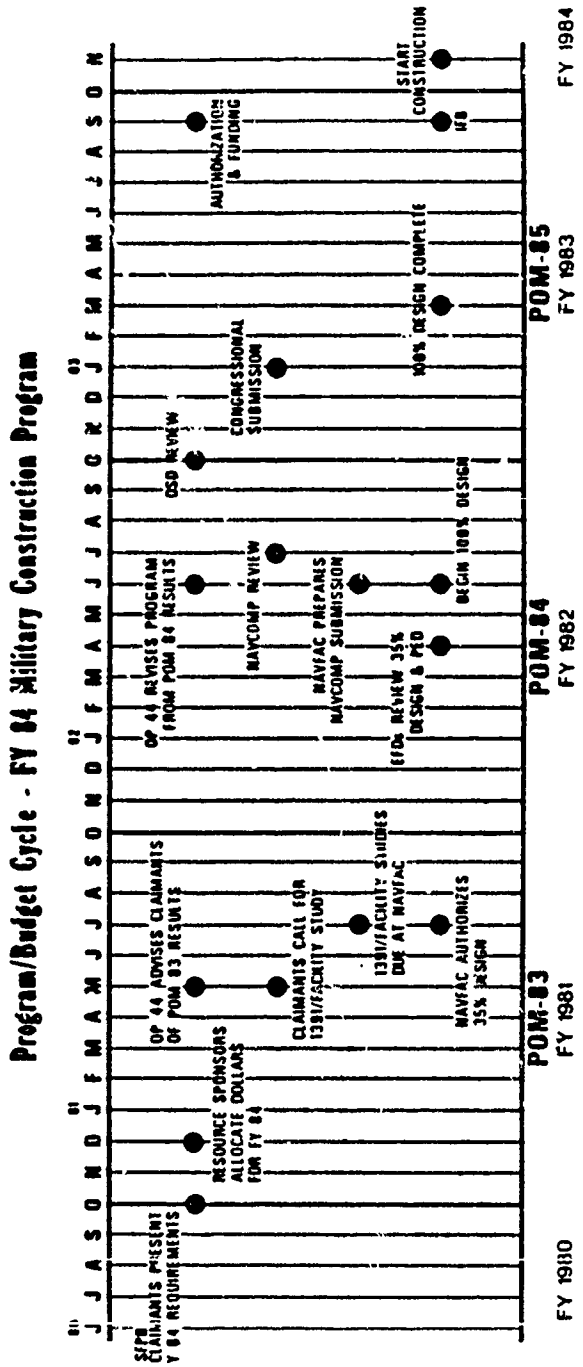
APPENDIX B
PUBLIC WORKS ORGANIZATION



APPENDIX C
SHORE FACILITIES PLANNING SYSTEM COMPONENTS AND RELATIONSHIPS (6:4-17)

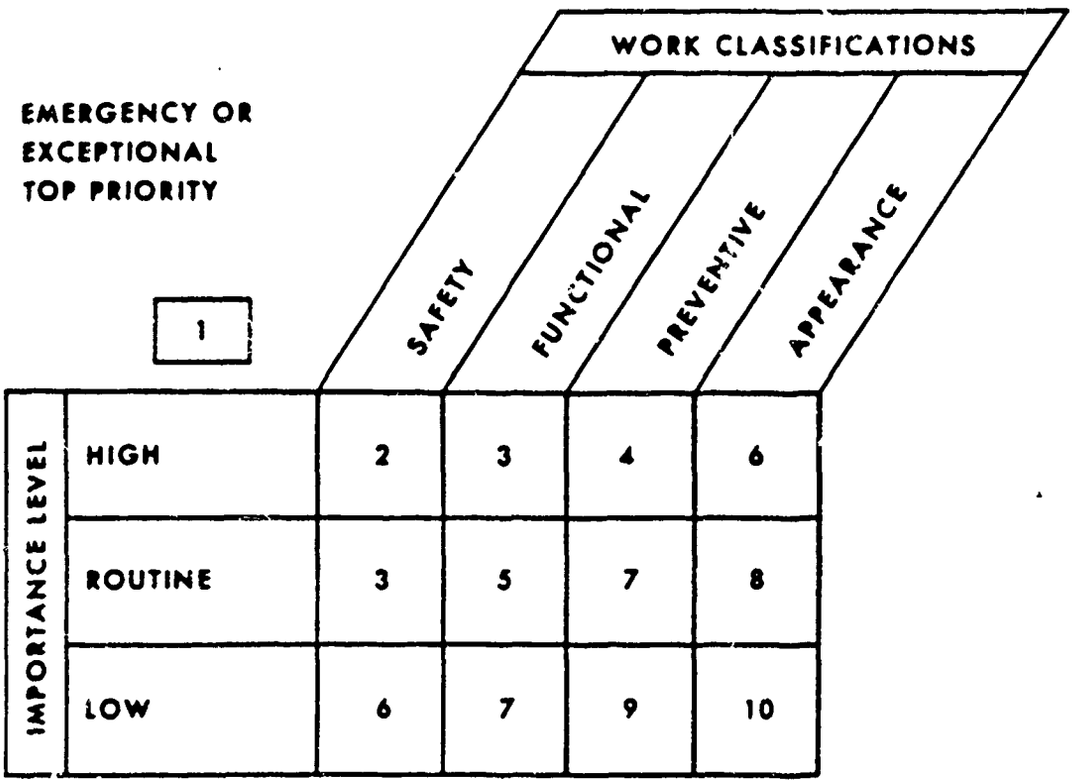


APPENDIX D
MILITARY CONSTRUCTION TIME CYCLE (6:4-30)

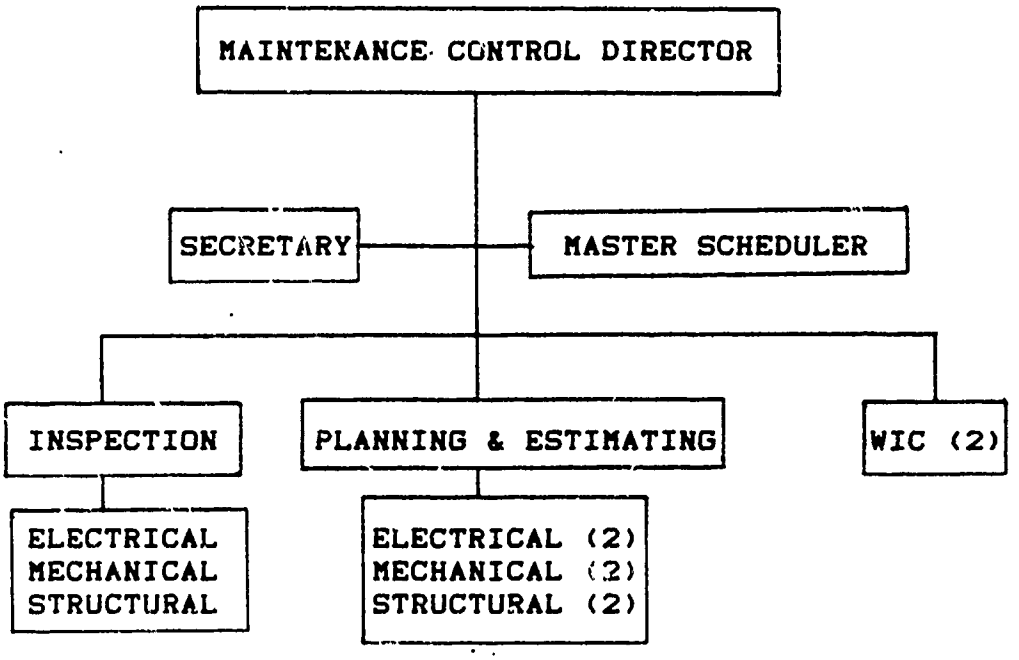


PROGRAM	CATEGORY OF WORK	LIMITS	PROJECT APPROVAL	APPROPRIATION
ANNUAL MAINTENANCE & OPERATION	MAINTENANCE	UNLIMITED		
	REPAIRS	<$75,000	COMMANDING OFFICER	O&MN (LOCAL)
	CONSTRUCTION	<$25,000		
	EQUIPMENT INSTALLATION	<$15,000		
SPECIAL PROJECTS	MAINTENANCE	>$75,000	SPONSOR	O&MN (M.C.)
	REPAIRS	$75,000 - 500,000	SPONSOR	O&MN (M.C.)
	EQUIPMENT INSTALLATION	>$15,000	SPONSOR	O&MN (SPONSOR)
	MINOR CONSTRUCTION	$25,000 - 200,000	SPONSOR	O&MN (SPONSOR)
	REPAIRS	>$500,000	ASN (S&L)	O&MN
		>$100,000 & 50% of replacement value		
FUNDED MILITARY CONSTRUCTION	EMERGENCY CONSTRUCTION	<$30 Million	ASN (S&L) & CONGRESS	MCN
	RESTORATION OF DAMAGED FACILITIES	>$1 Million	ASN (S&L) & CONGRESS	MCN
	CONTINGENCY CONSTRUCTION	>$1 Million	DASD (I&H) & CONGRESS	MCN
FUNDED MILITARY CONSTRUCTION	UNSPECIFIED MINOR CONSTRUCTION (UMC)	$200,000 - 500,000	CNO	MCN (UMC)
		$500,000 - 1 Million	ASN (S&L) & CONGRESS	MCN (UMC)
	PLANNING AND DESIGN	>$300,000	ASN (S&L) & CONGRESS	MCN
	MILITARY CONSTRUCTION PROJECTS	>$1 Million	CONGRESS	MCN
	REAL PROPERTY ACQUISITION	>$50,000	CONGRESS	MCN

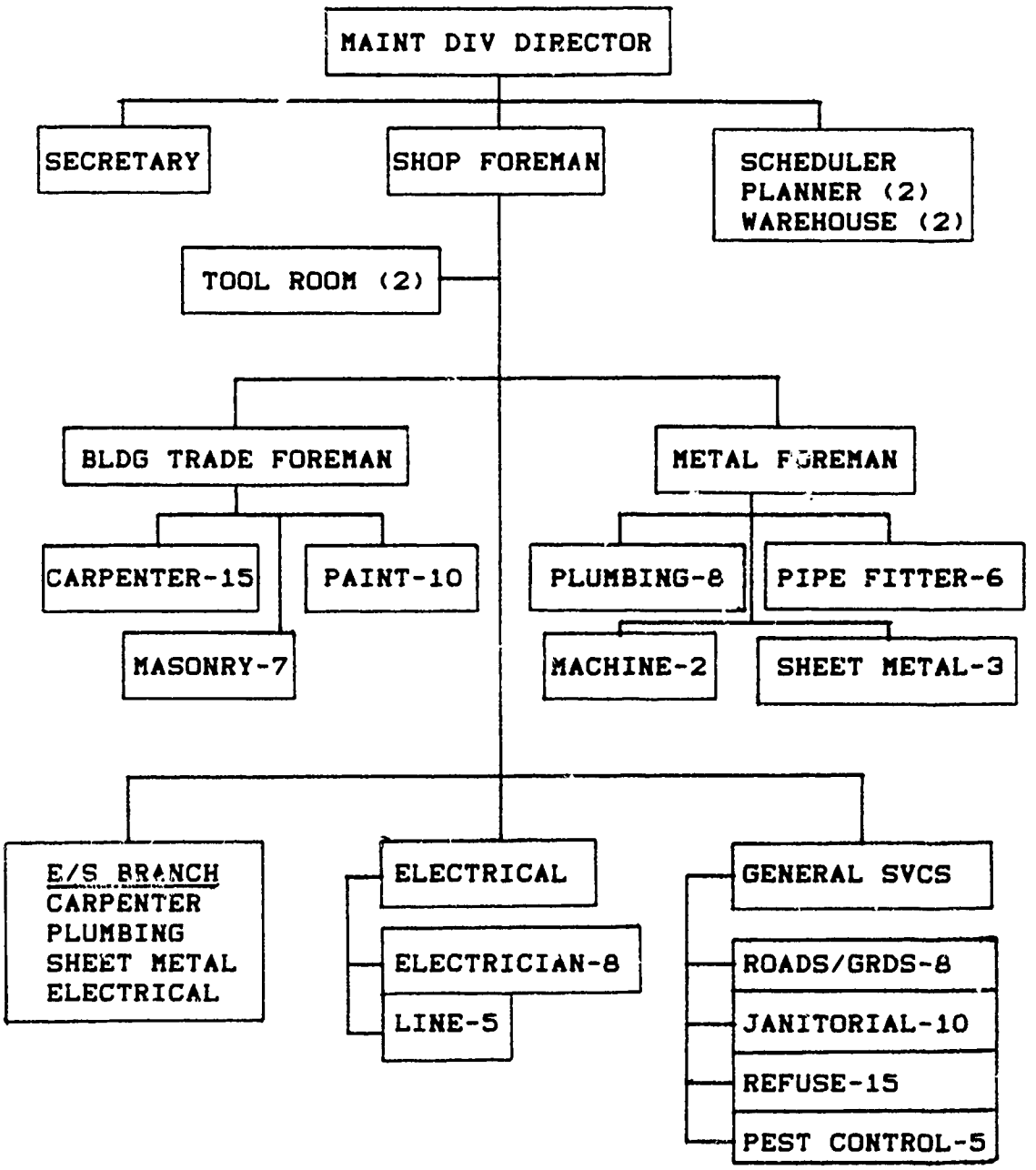
APPENDIX F
SAMPLE PRIORITY MATRIX (3:6-7)



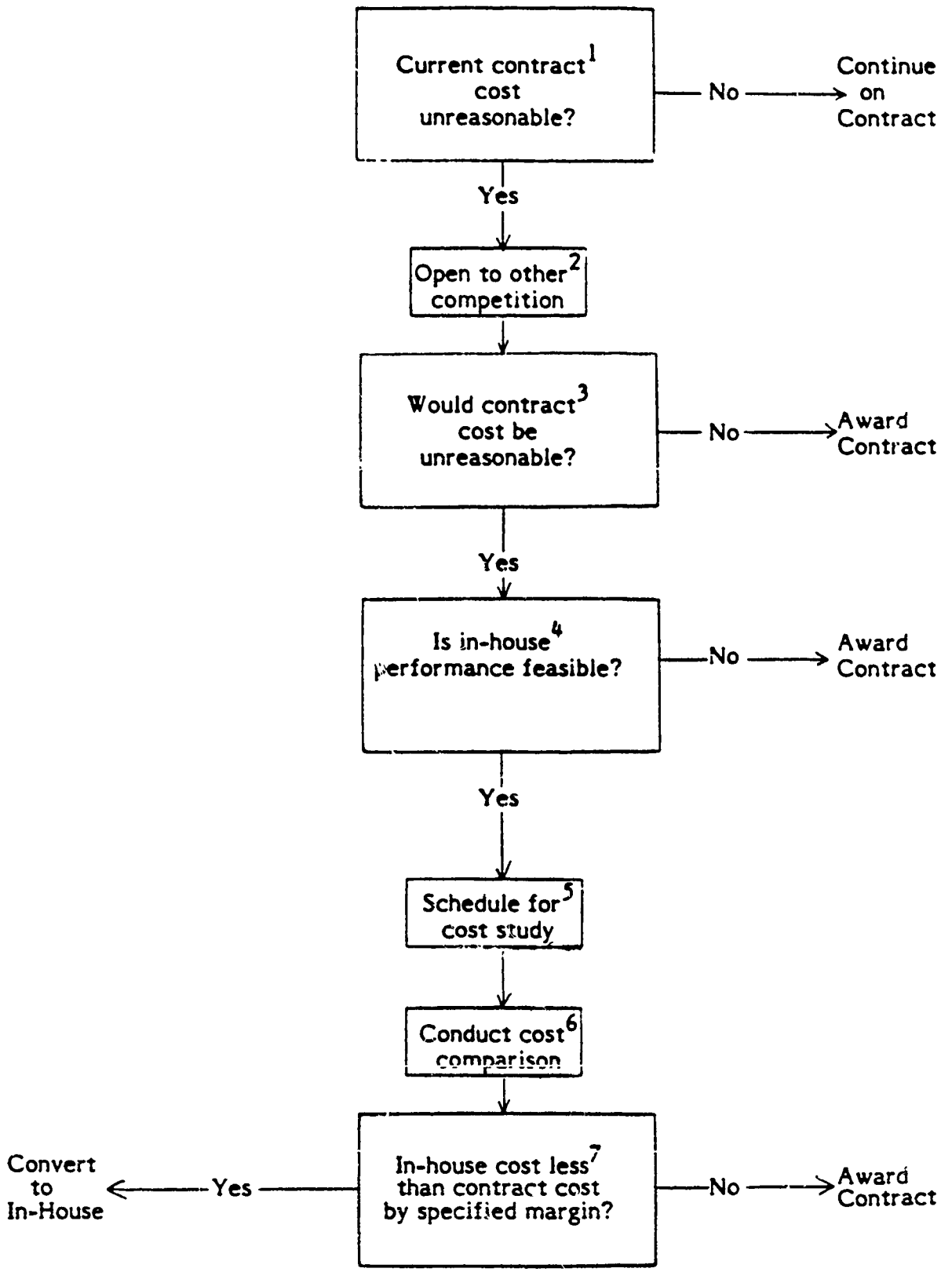
APPENDIX G
MAINTENANCE CONTROL ORGANIZATION



APPENDIX H
MAINTENANCE DIVISION ORGANIZATION



APPENDIX I
EXISTING CONTRACT FLOW CHART



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17. Interview with LCDR Kevin McNamara, CEC, USN, Facilities Support Staff, Naval Sea Systems Command, Washington DC on May 6, 1985.

18. Interview with LT Mike Brozzo, CEC, USN, Naval Air Station Jacksonville Maintenance Plan Coordinator on June 4, 1985.

19. Interview with Mr. Bob Hammond, Code 15, Naval Facilities Engineering Command, Alexandria, Virginia on May 6, 1985.